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THE NAVY'S SEARCH FOR A FEW GOOD WOMEN: ANALYSIS OF A DIRECT MAIL CAMPAIGN

by

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Submitted in partial fulfillment
of the requirements for the degree of

MASTER OF SCIENCE IN OPERATIONS RESEARCH

from the

NAVAL POSTGRADUATE SCHOOL
September 1993

REPORT DOCUMENTATION PAGE

Form Approved OMB Np. 0704

1. AGENCY USE ONLY *(Leave blank)*	2. REPORT DATE September 1993	3. REPORT TYPE AND DATES COVERED Master's Thesis

4. TITLE AND SUBTITLE The Navy's Search for a Few Good Women: Analysis of a Direct Mail Campaign	5. FUNDING NUMBERS
6. AUTHOR(S) Lieutenant Ronda Jean Beagle, USN	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Naval Postgraduate School Monterey CA 93943-5000	8. PERFORMING ORGANIZATION REPORT NUMBER
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)	10. SPONSORING/MONITORING AGENCY REPORT NUMBER

11. SUPPLEMENTARY NOTES The views expressed in this thesis are those of the author and do not reflect the official policy or position of the Department of Defense or the U.S. Government.

12a. DISTRIBUTION/AVAILABILITY STATEMENT Approved for public release; distribution is unlimited.	12b. DISTRIBUTION CODE A

13. ABSTRACT *(maximum 200 words)*

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14. SUBJECT TERMS Recruiting Women; Women in Technical Rates; Logistic Regression	15. NUMBER OF PAGES 120
	16. PRICE CODE

17. SECURITY CLASSIFICATION OF REPORT Unclassified	18. SECURITY CLASSIFICATION OF THIS PAGE Unclassified	19. SECURITY CLASSIFICATION OF ABSTRACT Unclassified	20. LIMITATION OF ABSTRACT UL

NSN 7540-01-280-5500 Standard Form 298 (Rev. 2-89)

Prescribed by ANSI Std 239-18

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The purpose of this thesis was to attempt to select significant individual characteristics of women who met Navy Recruiting Command standards for enlisting in technical rates. Additionally, it attempted to select geographic characteristics of these qualified women. To that end, a logistic regression analysis was conducted on data from approximately 100,000 qualified high school juniors and seniors. For a student to be qualified for this study, she must have scored above the 31st percentile on the AFQT and above the 50th percentile on one of three subtests: Auto-Shop Information, Electronics Information, or Mechanical Comprehension. The database contained Military Entrance Processing Command files and 1990 Census data. This research found for individual regression models interaction effects were present between future plans and geographic area, and between service preference and geographic area when determining interest in the military. It found for geographic regression models the proportion of students interested in military service out of those available increased in geographic areas (Naval Recruiting Districts) where more personnel were in the armed services, more people were associated with technical occupations, and where median family income was higher. The analysis found the proportion of students available for military service out of the target market population (females aged 17-21 years) decreased in geographical areas where unemployment rate was higher, more people were associated with technical occupations, more people lived below the poverty level, and where median family income was higher.

ACKNOWLEDGMENTS

The author wishes to thank Professors So Young Sohn and Glenn Lindsay for their patience and expertise; and Helen Davis (my computer heroine) for her tireless assistance.

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EXECUTIVE SUMMARY

With more non-traditional, sea-intensive billets open to women, the male population aged 17-21 years eligible for military service decreasing, and mission requirements increasing, the Navy believes that it is essential to recruit quality females. This thesis attempted to identify individual characteristics of women who are eligible by Navy standards to enlist in these technical, non-traditional, sea-intensive ratings. The study also chose significant local area characteristics of these qualified women. In order to meet this objective, an analysis of the Navy Recruiting Command's recent direct mail campaign was conducted.

The focus of the campaign was directed towards female high school juniors and seniors who met the Navy Recruiting Command's qualification standards. To be qualified for this study, these high school students must have scored in or above the 31st percentile on the Armed Forces Qualification Test and scored above the 50th percentile on one of three subtests: Auto-Shop Information, Mechanical Comprehension, or Electronics Information. A standardized form letter which addressed education, career, and advancement opportunities in the Navy, as well as other positive enlistment aspects, was mailed to these 100,000 female high school students who met Navy qualifications. The recipient, if interested in the Navy, needed only to return the postcard provided in the letter. The response rate was 1.0 percent and 0.4 percent for the juniors and seniors (respectively). The data with names of these qualified and

interested students were merged with the Military Entrance Processing Command files. In addition, data from the 1990 United States Bureau of Census were used in the logistic regression model analysis.

For the population of high school juniors, individual regression models indicated interaction effects were present between the student's future plans and her geographic area, and between her service preference and geographic area. Having used students from the western region whose future plans included enlistment in the military as the reference group, students whose future plans also included enlistment intentions, regardless of their geographical location, were not significantly more or less interested in the military than the reference group. However, students from the northeastern region whose future plans included something other than enlisting (e.g., continued education), were the least likely to be interested in the military. Students from the Northeast, Midwest, and South were less likely to be interested in the military, regardless of the service choice, than students from the western region who preferred the Navy. The analysis found the predicted probability of the proportion of students (per geographic area) interested in the military out of those qualified and available increased when there were more personnel in the armed forces and the median family income was higher. When the unemployment rate was higher and there were more people existing below the poverty level, the proportion of students qualified and available for military service out of the target market population decreased.

Individual regression models for the population of high school seniors indicated interaction effects were present between the student's future plans and her geographic

junior population. Again, students from the West whose future intentions were to enlist were used as the reference group. This regression model found that students from the Midwest and the South Central states whose future plans did not include military service were less likely to be interested in the military than the reference group. Students from the western region who preferred a service other than the Navy and students from the northeastern region who preferred the Navy were more likely to be interested in the military than western region students who preferred the Navy. The analysis indicated the proportion of senior high school students interested in the military out of those qualified and available increased (per area) as the number of personnel in the armed forces, the number of people in technical occupations, and median family income increased. The proportion of students qualified and available for military service out of the target market population decreased (per area) as the unemployment rate, median family income, and the number of people existing below the poverty level increased.

Previous studies by other organizations concluded that age, level of income, and employment rate were significant factors in determining propensity to enlist for females aged 17-21 years. In contrast this study which focused on high school students who met Navy qualifications, found that for a geographic area the number of personnel in the armed forces, the number of people existing below the poverty level, the number of single parents, the number of people in technical occupations were significant variables.

I. INTRODUCTION

Due to the All Volunteer Force Transition, the Department of Defense is concerned that the supply of qualified males for military service will not meet quantity and quality requirements. The United States Bureau of the Census projected that there would be a steady decline in the male population (ages 17-21 years) through the mid-1990's. This population represents the primary supply of personnel from which the military obtains recruits. Women were anticipated to alleviate this predicted shortfall of male personnel available to the military and to account for approximately 11 percent [Ref. 1:p. 14] of the overall enlisted strength. Even with the current reduction in forces, the need for quality recruits still exists in order to meet mission requirements. With more non-traditional, sea-intensive billets open to women, the qualified eligible male population decreasing, and mission requirements increasing, the Navy believes that it is essential to recruit quality females.

Very few studies have been conducted to determine the factors that prompt women to be interested in technical, non-traditional, sea-intensive roles. Previous studies estimated the propensity of women to enlist and examined the individual, local market, and recruiter effort characteristics of the enlisted woman [Ref. 2]. These previous studies discussed enlistment of women in general but made no mention of the characteristics of women in technical, non-traditional positions. This thesis will attempt to select significant individual characteristics of women, who are eligible by

Navy standards to enlist in these technical, non-traditional, sea-intensive ratings. In addition, the study will choose significant local area (individual Naval Recruiting Districts) characteristics of these qualified women (potential recruits). The research will focus on women who are intellectually qualified for non-traditional positions in the Navy. In order to meet this objective, an analysis of the Navy Recruiting Command's recent direct mail survey will be conducted.

The information presented in this study should enable the Navy Recruiting Command to more effectively market potential recruit "rich" areas in order to increase the percentage of women qualified for technical, non-traditional, sea-intensive ratings in the Navy. The results of this study will benefit the Navy in that it will lend a better understanding of the characteristics of the qualified woman and where she may be located, in order to apply specific recruiting techniques and effectively spend advertisement dollars.

The proposed objective will be accomplished in the following four chapters. Chapter II will present specific background information and discuss previous studies related to recruiting women. The primary focus of Chapter III will be the discussion of the data used, and how the data sample was derived. Additionally, this chapter will concentrate on the formulation of the logistic regression model used to select the individual characteristics of the women who are eligible for technical, non-traditional ratings. A second regression model will be used to select the factors effecting potential qualified female recruits in individual Naval Recruiting Districts (NRDs). Chapter IV will review the results of the developed model insuring objectives have been met.

Chapter V will synthesize the results of Chapters III and IV. A summary of conclusions and recommendations will be presented in this chapter.

II. BACKGROUND AND LITERATURE REVIEW

A. BACKGROUND

Women have been part of the military from the time the nation was formed. The scope of their participation has changed over the decades and is continuing to change. The Navy Nurse Corps was formed in 1908. At the beginning of World War I (WWI), women were needed to fill positions in addition to medical field roles, and as such, voluntarily served their country in an administrative and clerical capacity. Women successfully completed these missions, but the end of the war brought a decreased need for these positions to be filled, which resulted in the demobilization of enlisted women. During World War II (WWII), however, the military was faced with an unprecedented shortage of personnel. Women once again volunteered to participate in the military. Their involvement was more extensive than in WWI; in addition to the administrative positions, many women filled technical positions in non-combat units, such as radio communications and repair, control tower operations, and engine repair [Ref. 3:p. 60]. Women also served as noncombatant pilots and aviation instructors [Ref. 3:p.64]. In 1942, after much debate in the Congress, the Women's Auxiliary Army Corps (WAAC) and the Women Accepted for Voluntary Emergency Service (WAVES) were formed. In addition, the Marine Corps and the Coast Guard established reserve components for women. Later, in 1943, the Women's Army Corps (WAC) was established replacing the WAACs. By the end of WWII, approximately

two percent of the active duty U.S. forces were women. After WWII, their participation was once again limited to administrative and clerical roles.

The Armed Service Integration Act of 1948 limited the size of the women's corps to two percent of authorized strength for each respective service. This imposed limitation was not reached until the late 1960's, during the Vietnam build-up. In 1967 this restriction was removed and throughout the 1970's, women serving on active duty increased from two percent to approximately eight percent.

With the end of the Vietnam Conflict, the All Volunteer Force was created. The United States Bureau of the Census projected a steady decline in the male population (ages 17-21 years) through the mid-1990's. The Department of Defense was concerned that the supply of qualified males for military service would not meet quantity and quality requirements. As a result, studies were directed in order to determine how women could offset this shortage. Women accounted for approximately ten percent of the military strength in the 1990's.

B. PREVIOUS STUDIES

Studies and research efforts have taken place in the area of women in the military. For the research reported here, three major studies conducted at Navy Personnel Research and Development Center (NPRD), Defense Manpower Data Center (DMDC), and RAND Corporation (RAND) were selected for review in order to gain insight into the enlistment of women in the Navy. First of all, a study was conducted in 1980 by NPRD [see Borack, 1980, Ref. 4] in order to predict the number of women qualified

and interested in joining the military. This study used fiscal year 1979 data from DMDC, the Bureau of Census, and a survey conducted by NPRD. A group of individuals aged 17-24 years was selected by DMDC. This age group had the greatest percentage of female enlistments (92 percent) for fiscal year 1979 [Ref. 4:p.1] and as such, was used as the target population. Using Census Bureau data, the overall population of females between the ages of 17 and 24 was then calculated. That female population, in order to be eligible for military service, must have met physical and medical standards in additional to intellectual qualifications. Data from the National Health and Nutritional Examination Survey (conducted by NPRD) were analyzed in order to estimate the percentage of the population who failed to meet minimum physical and medical standards. The study, as reported thus far, consisted of females in the age group of 17 to 24 years who met physical and medical standards of the military. These females must have qualified in mental aptitude to be included in the study. Defense Manpower Data Center provided information about high school seniors having taken the Armed Services Vocational Aptitude Battery (ASVAB) exam from 1977 to 1979. This allowed for an estimate of mental grade distribution. Females who met the standards for the physical, medical, and mental areas must not be a single parent in order to be qualified for the study. The study concluded there would be enough females qualified to fill billets if male enlistment goals were not met.

Second, in March 1985, the DMDC completed research directed by Congress on the propensity of women to enlist in the military [see Kiplinger, Boesel, Johnson, 1985, Ref. 5]. Data from three on-going surveys were used in the analysis: the Youth

Attitude Tracking Study (YATS), National Longitudinal Survey of Youth Labor Market Experience (NLS), and High School and Beyond Survey (HSB).

The Youth Attitude Tracking Study is a Department of Defense study which was initiated in 1975 and is an annual survey of approximately 7,000 young men and women ages 16 to 21. This survey is conducted via the telephone, and is used is to determine an individual's interest in joining the military. The likelihood of joining the military is dependent on the individual's response to specific questions about the military.

The second survey, National Longitudinal Survey of Youth Labor Market Experience is an annual Department of Labor survey initiated in 1979. A sample of 12,000 men and women (aged 14 to 21 years) who are representative of the country's youth was interviewed in the spring of 1979 and reinterviewed each year. The survey's purpose is to collect data on the education and work experiences of the American youth population.

The third survey used in the analysis was the High School and Beyond Survey. This survey was initiated in 1980 by the National Center for Education Statistics and is conducted biennially. Random samples of approximately 30,000 high school sophomores and seniors were interviewed and then reinterviewed every two years in order to collect data on education and career experiences.

Using the results of the three surveys, YATS, NLS, and HSB, the Defense Manpower Data Center chose to conduct a trend analysis in order to make conclusions about women's propensity to enlist in the military. The 1985 report to Congress

concluded that men were 2.5 to 5.0 times as likely as women to express an interest in enlisting in the military [Ref. 5:p.43]. As age (expressed by year in school), level of income, and employment rate increased, individual propensity to enlist became negative for men and women. For those women not interested in joining the military, the two most common reasons attributed to this negative propensity were pursuing further education and separation from family and friends.

The third major study concerning enlistment of women in the military was conducted in 1990 by RAND Corporation [see Hosek, Peterson, 1990, Ref. 2]. This study focused on individual characteristics of female enlistments and used a regression analysis to complete the research on women's enlistment in the military. The study consisted of two separate samples taken in the spring of 1979: the 1979 Armed Forces Entrance and Examination Station (AFEES) WAVE I and the NLS. Separate multivariate analyses were made for high school seniors and for those who already graduated (ages 17 to 22). Again, the model used to estimate female enlistment was a logistic regression model.

The RAND Corporation went one step further than other research efforts and examined the factors effecting the flow of new recruits, focusing on individual characteristics of women. RAND determined that individual enlistment intentions were a function of alternatives (choices) and recruiter effort [Ref. 2:p.23]. To complete this study, RAND used a logistic regression model. It was concluded that the enlistment decisions of men and women were affected by the same characteristics, but some differences did occur. First, the Armed Service's recruiting goals for women were

lower than that of men. Second, labor related variables had a smaller effect for women. Third, women who plan to marry within the next five years did not desire to enlist. Looking at the characteristics of women, education-related variables, family income, the number of siblings in the family, a mother's education and work history (worked when child was 14), and employment variables all had an effect on enlistment intentions.

Previous studies estimated the propensity of women to enlist and examined individual, local market, and recruiter effort characteristics of the enlisted woman. These previous studies discussed enlistment of women in general but made no mention of the characteristics of women in technical, non-traditional positions.

The next chapter will focus on the discussion of the data used, and how the data sample was derived. Additionally, it will concentrate on the formulation of the logistic regression model used to select the individual characteristics of women who are eligible for technical, non-traditional ratings. A second regression model will be used to select the factors effecting potential qualified female recruits in individual NRDs.

III. METHODOLOGY AND DATA ANALYSIS

The previous chapter reported studies that have been conducted to determine the characteristics that prompt women to be interested in enlisting in the military. Specifically, these research efforts have concentrated on estimating the propensity of women to enlist, and to ascertain whether or not there will be enough interested and qualified women to meet overall strength requirements. This thesis will go beyond the scope of previous studies and attempt to select significant characteristics of these positively propensed young women. The purpose of identifying these factors is to enable the Navy Recruiting Command to more effectively market geographic areas in order to recruit quality women to fill technical, sea-intensive rates. In order to meet this objective, a discussion of the data sample and the methodology is required. This chapter will discuss the Navy Recruiting Command's direct mail survey campaign and the method of analysis chosen.

A. DATA REVIEW

In an attempt to specify significant characteristics of women who are intellectually qualified for non-traditional, sea-intensive rates in the Navy, the Navy Recruiting Command conducted a direct mail campaign. The focus of the campaign was directed towards high school female juniors and seniors who met the Navy Recruiting Command qualification criteria. To be qualified for this study, this group of high school students must have taken the Armed Forces Qualification Test (AFQT) and scored in the thirty-

first (31st) percentile. The AFQT scores are grouped into six broad categories (I, II, IIIA, IIIB, IV, and V), based on the percentile scores ranging from ninety-nine to one. Those falling in Category V (scores of 1-9) are disqualified from service by law, as well as those in Category IV (scores of 10-30) who have not graduated from high school. The following table summarizes these AFQT categories.

Table 3.1 AFQT CATEGORIES

AFQT CATEGORIES
CORRESPONDING PERCENTILE SCORE RANGES

AFQT CATEGORY	PERCENTILE SCORE
I	93 - 99
II	65 - 92
IIIA	50 - 64
IIIB	31 - 49
IV	10 - 30
V	1 - 9

In addition to scoring in Category IIIB or above, these female high school students must have scored above the fiftieth (50th) percentile on one of three Armed Services Vocational Aptitude Battery (ASVAB) subtests designated as technical by the Navy Recruiting Command. The three technical ASVAB subtests were Auto-Shop Information (AS), Mechanical Comprehension (MC), and Electronics Information (EI). There were approximately 100,000 female high school juniors and seniors in 1992 who

met qualifications as set forth by the Navy Recruiting Command (across the nation). The database was reported to have erroneous data removed and the data set now contained 75,000 female high school juniors and seniors. A standardized letter was then mailed to the 75,000 qualified female high school students throughout the recruiting districts in the United States. There were approximately 50,000 junior records and 25,000 senior records. These students, at the time of the mail campaign, were either seniors (who recently completed their junior year of high school) or recent graduates. But for the purpose of this paper, these students will be referred to as juniors and seniors (the academic year the AFQT was administered). The standardized form letter addressed the education, career, and advancement opportunities, as well as other positive aspects of enlisting in the Navy. Appendix A of this thesis contains the standardized form letter mailed to qualified students. The recipient, if interested in the Navy, needed only to return the postcard provided in the letter to the Navy Recruiting Command. The response rate for the standardized letter was one percent and 0.4 percent for juniors and seniors, respectively. It may be speculated as to why the seniors did not respond as well as the juniors and one might conclude the low response rate of the senior high school population was due to the fact that at the time of the survey, many seniors had already been accepted to various colleges and universities or were participating in the work force. For the study reported here, all records were cleared of missing or unreadable information. The information from the returned postcards was merged with previously Military Entrance Processing Command (MEPCOM) files. The MEPCOM files contain information about the individual; specifically, AFQT and

ASVAB scores, education level, future plans or intentions, service tested, Navy Recruiting District and/or Station, zip code, high school name and code, and social security number. The data set used for this thesis included not only information extracted from the MEPCOM files and the direct mail campaign administered by the Navy Recruiting Command, but also data from the 1990 United States Bureau of Census. Census Bureau data were used to aid in the selection of significant local area (individual NRD) characteristics of these female high school students who were qualified and interested in enlisting in the Navy. The broad-scoped variables of the Census data included information for each county about population, education attainment level, armed services population, median family income, parental occupation, unemployment rate, and information about the head of the household (married, single).

B. METHODOLOGY

Using the information gained from the Navy Recruiting Command survey, MEPCOM files, and the 1990 Census data, a logistic regression model was used. A logistic regression model was selected because the outcome was dichotomous - the individuals were classified into one of two populations: interested in enlisting in the Navy, or not. This type of model enables the analyst to decide which characteristics are predictive of the population and was thus chosen to select individual and later local characteristics of young women who are eligible for technical, non-traditional ratings in the Navy.

The response variable, Y_i, can take on one of two values: zero or one. When $Y_i=1$, qualified individual ***i*** is interested in joining the Navy; and conversely, when $Y_i=0$, individual ***i*** is **not** interested in joining the Navy. The dependent variable, Y_i, would follow the Bernoulli distribution with parameter p; where p is the probability that a randomly selected qualified individual ***i*** would be interested in joining the Navy. It can be assumed that p_i would be a function of predictor variables for individual ***i***. For this model, the response variable, a randomly selected student ***i*** out of the population of qualified and available high school students, was likely to be interested in the Navy, may be a function of future plans, geographic area, service tested (preference of service), or time of year the AFQT was administered ($x_{2i}, \ldots, x_{ki}$). Further, the value of p is bounded by zero and one [Ref. 6:p.6]. As such, the following logistic regression model was employed [Ref. 6:p.6][Ref. 7:pp.480-481]:

$$p = \frac{e^{Z_i}}{1+e^{Z_i}}$$

$$= \frac{1}{1+e^{-Z_i}},$$

where $Z_i = \beta_1 + \beta_2 x_{2i} + \ldots + \beta_k x_{ki}$.

The odds ratio in favor of enlisting in the Navy is represented by the equation:

$$\frac{p}{1-p} = \frac{\left(\frac{1}{1+e^{-z_i}}\right)}{\left(\frac{e^{-z_i}}{1+e^{-z_i}}\right)} ,$$

and is defined as the ratio of the probability of being interested in enlisting in the military to the probability of not being interested. By taking the natural log of this odds ratio, the logit model for p is expressed by:

$$\begin{aligned} Logit(p) &= \ln\left[\frac{p}{1-p}\right] \\ &= \ln\,[e^{z_i}] \\ &= z_i \\ &= \beta_1 + \beta_2 x_{2i} + \ldots + \beta_k x_{ki} \ . \end{aligned}$$

Now that the model has been defined, a procedure is needed to estimate the unknown parameters (β_1, β_2, . . ., β_k). The method of maximum likelihood estimation maximizes the probability of obtaining the unknown parameters [Ref. 6:p.8]. The likelihood function is the product of the probability density function of the Bernoulli random variable to which the conditional probabilities of the binary response variable are applied. The likelihood equation is expressed as:

$$L(p_1, p_2, \ldots, p_n) = \prod p_i^{y_i}(1-p_i)^{1-y_i} \quad ,$$

where i = 1, 2, . . . , n. The likelihood function is easier to use when the natural log is applied to the function. In order to maximize this expression, the likelihood function must be differentiated with respect to each parameter and then set equal to zero. The equations are then solved simultaneously to obtain estimates for the unknown parameters.

A second logistic regression model was used to select factors effecting potential qualified female recruits in individual Naval Recruiting Districts (local area). The regression model and methodology are very similar to that which was used for selecting individual characteristics. Using the data aggregated by each NRD, Y_i represents the observed number of responses in NRD i out of the number of standardized form letters mailed to NRD i (n_i). The response variable, Y_i, is assumed to be binomially distributed with probability of response rate at NRD i given by p_i. [$Y_i \sim B(n_i, p_i)$]. In this second regression model, the broad-scope predictor variables selected from the 1990 Census data for each NRD i, are defined as population, the number of people with a specific education attainment level, median family income, parental occupation (classified as the number of people associated with technical or non-technical employment), unemployment rate, and the number of people that are heads of the household (e.g., the number of married couples or single parents that are heads of households).

Chapter III has dealt with the data sample used in the regression model, as well as a derivation of the regression model. The regression model was used for both individual and local geographic (individual NRDs) analysis in order to determine characteristics of potential recruits and enlistment behavior. Chapter IV will discuss the results of both estimated models insuring thesis objectives are met.

IV. ANALYSIS OF THE RESULTS

Logistic regression models were used in an attempt to select significant characteristics of positively propensed young women. The group of young women included in this study were high school juniors and seniors who were qualified by Navy Recruiting Command standards for technical rates. This study was different from previous studies in that it concentrated on the traits of women qualified for non-traditional, sea-intensive rates in the Navy. This research effort was completed so that the Navy Recruiting Command has useful information in order to apply specific recruiting techniques and advertisement strategy to areas where female high school students are qualified for technical rates in the Navy. This chapter will focus on the variables selected for inclusion in the regression models, the results of the logistic regression models, and an interpretation of the results.

In order to complete the analysis for this thesis, SAS Release 6.07 [Ref. 8], a statistical software package, was used on the AMDAHL Model 5995 mainframe computer located at the Naval Postgraduate School. The statistical package, SAS, is proprietary software licensed to the Naval Postgraduate School.

A. PRELIMINARY ANALYSIS

The names of the 75,000 qualified female high school juniors and seniors were merged with previously extracted Military Entrance Processing Command (MEPCOM) files. From the merged MEPCOM files and data containing students' names, all

students who received the Navy Recruiting Command standardized letters were considered Qualified Military Available (QMA) and those students who responded to the standardized letter were considered Qualified Military Interested (QMI). It is important to note that in previous studies, individuals available for military service (generally in a target age group, depending on the study) were considered QMA. However, for this study, to be considered qualified and available or QMA, an individual female must have recently completed her high school junior or senior academic year in October 1992, scored above the 31st percentile on the AFQT, and scored above the 50th percentile on one of three ASVAB exams considered technical by the Navy Recruiting Command. Having met the above criteria, an individual was considered to be qualified and available, or QMA. The target market population consisted of young women between the ages of 17 and 21 years as reported by the 1990 Census. There were 828,460,000 young women who fell in the target market population category. For the population of high school juniors, there was a 1.0 percent response rate, and for the population of high school senior students, there was a 0.4 percent response rate. Perhaps the low response rate for the population of high school seniors may have been because this group of individuals had already enrolled in colleges, joined the work force, or had other plans. This merged information contained data concerning each individual; such as test scores, future plans, preference of service, etc. The data were grouped into separate files containing information concerning the population of high school juniors and seniors. The subgrouping allowed for comparisons to be made between the two populations. The junior and senior data sets were further grouped into

the 35 NRDs. This additional subgrouping permitted selection of characteristics for local areas.

Turning to the information of population of QMI and QMA students for the NRDs, it is more convenient to discuss results by Navy Recruiting Regions in lieu of each individual NRD. There are five regions which the Navy Recruiting Command has defined to represent areas of the United States. Region 1 has been defined to represent the states from the Northeast and is comprised of five NRDs; NRD 102 - Boston, NRD 103 - Buffalo, NRD 104 - New York City, NRD 119 - Philadelphia, and NRD 120 - Pittsburgh. Similarly, Region 3 is representative of the southeastern states and is comprised of seven NRDs, from Montgomery, Alabama to Miami, Florida. Region 5 has been defined to represent the midwestern states, and eight NRDs fall in this region. The South Central states delineate Region 7 which also contains eight NRDs. Finally, Region 8 covers the western states contains and seven NRDs. The regions with the greatest proportion of qualified and available (QMA) students out of the target market population were Region 7 and Region 3 (the South Central and Southeast, respectively). Tables B.1.A and B.1.B, in Appendix B, illustrate the relationships between NRDs, QMIs, QMAs, and the target market population (referred to as TOTAL) for the population of high school juniors (referred to as JQMI and JQMA) and the population of high school senior students (referred to as SQMI and SQMA).

Focusing the preliminary analysis on the population of high school juniors, the majority of students classified as qualified and available (or JQMA) took the AFQT during the fall months. The mean score for the AFQT in all NRDs was well above the

31st percentile, one of the requirements to be eligible for the mail campaign. Region 1, the northeastern states, scored the highest of all five regions, while Region 7, the South Central states, scored the lowest. Another requirement for qualification in non-traditional rates (as set forth by the Navy Recruiting Command), was for the student to have scored above the 50th percentile on one of three ASVAB subtests: Auto-Shop Information, Mechanical Comprehension, or Electronics Information. In every NRD, the mean ASVAB score above the 50th percentile was Mechanical Comprehension. Table B.2, located in Appendix B, presents the AFQT scores and the three technically categorized subtests. The tables in Appendix B are presented in the order of the population of high school juniors, followed by the population of high school seniors, and are discussed below (in the same order of presentation).

The majority of juniors who were qualified and available for military service (JQMA) planned to attend a four year college. It may be of interest to determine if these students actually enrolled in a four year college, or changed plans. The 1985 Report to Congress (researched by Defense Manpower Data Center) and the RAND Corporation both stated that approximately two-thirds of the negatively propensed females actually enlist in the service [Ref. 4:p.31][Ref. 5:p.4]. More high school juniors planned to enlist in the military rather than receive vocational training or join the work force. The majority of high school junior students preferred the Army as the service of choice in all regions. The second most popular service for the South Central, western, and southeastern states was the Navy. The Air Force was the second most popular service of choice for the Northeast and Midwest regions. Table B.3 and Table

B.4, also found in Appendix B, summarize these findings for the population of high school juniors who were qualified and available for technical rates in the Navy.

For the population of high school senior students, trends were very similar (almost identical) to that of the junior population, the only notable difference was that the Navy was the second most popular service for all except the Northeast region (high school senior students, again preferred the Air Force). This information is presented in Table B.5 through Table B.7 in Appendix B.

B. VARIABLE SELECTION

The previously extracted and merged MEPCOM files and the files containing names of the qualified female high school junior and senior students, were used in conjunction with data from the 1990 United States Bureau of Census. The data were used in an attempt to select significant variables for inclusion in the logistic regression models. Again, these data sets were categorized by the 35 Naval Recruiting Districts (to be used to choose local geographic characteristics).

The MEPCOM files included information pertaining to each individual and were the primary source of data for specifying individual characteristics of positively propensed students. On the other hand, the 1990 Census data were the primary source of information used to identify area characteristics for individual NRDs of the positively propensed high school junior and senior students (the QMI population out of the QMA population), as well as area traits of the students qualified and available (the QMA population) out of the target market population (females aged 17-21 years).

Turning to the individual regression model (the QMI population), it is necessary to first identify potential variables from the MEPCOM files in order to determine the likelihood of interest in the military (Navy) for a high school student. Recall that return of the response card signified interest in the military and that the MEPCOM files contained information pertaining to the each student (e.g., her future plans, service preference, and the month the AFQT was taken). To that end, specific variables initially chosen for inclusion in the individual regression model were PLANS (future plans), TMO (month AFQT administered), REGION (geographic area), and TSER (service preference) and are described below in detail. It was theorized that the response variable, a randomly selected student *i* out of the population of qualified and available high school students, was likely to be interested in the military, may be explained by her future plans, the month the AFQT was administered, region of the country, and her service preference. Most obvious for the determination of military interest was a student's future plans or intentions; thus, the variable PLANS was selected. Another possible influential variable may have been the service of choice for a student; as such, the variable TSER was chosen. The variable TMO or month in which a student was tested for the military exam (the AFQT) was selected to determine if time of year had an impact on her likelihood to be interested in the military. Finally, the variable REGION was selected to determine if likelihood of interest in the military varied from area to area in the United States.

A similar approach was followed when selecting variables for individual NRDs. The response variable in this case represented the proportion of responses in NRD *i* out

of the number of standardized form letters mailed to NRD i. In other words, it represented the probability a randomly selected qualified and available high school student in NRD i was also a high school student qualified and interested in military service. Initially, predictor variables for each NRD, such as the number of people classified as the head of the household (married, single parent), the number of people with a specific education attainment level (high school and beyond), unemployment rate, the number of people associated with a technical occupation, military presence (defined as the number of personnel in the armed forces in each NRD), the number of people attending a private or public school, median family income, and the number of people existing below poverty level were used in the logistic regression models. It was speculated that these variables may impact the proportion of students interested in the military out of those qualified and available, and impact the proportion of students qualified and available for military service out of the target market population (females aged 17-21 years).

C. RESULTS

The individual regression model attempted to select characteristics of the population of female high school junior and senior students who were qualified by pre-established standards to enlist in technical rates. The analysis focused on the population of high school juniors interested in the military (JQMI), followed by the population of high school senior students interested in the military (SQMI), and finally a comparison of the two populations was completed. It is important to note that when using SAS the

results (for individual regression models) are presented in such a way that an event is classified as the probability a randomly selected individual i is not interested in the military. With that in mind, the results have been interpreted according to this SAS classification.

The regression models for individual NRDs attempted to choose characteristics of the proportion of high school students who were likely to be interested in enlisting in the Navy (QMI) out of those who were qualified and available for technical rates in the Navy (QMA). Another set of regression models attempted to select characteristics of the proportion of high school junior and senior students who were qualified and available for military service (QMA) out of the target market population (females aged 17-21 years, referred to as TOTAL). The analysis followed the format of the individual regression models; the population of high school junior students was evaluated, followed by an analysis of the population of high school seniors, and then a comparison of the two populations was completed.

1. The Junior Population (JQMI)

The basic regression model (as stated in Chapter III) for the JQMI population is specified as follows:

$$\text{Logit (p)} = \beta_1 + \beta_2 x_{2i} + \ldots + \beta_k x_{ki} \text{ ,}$$

where $x_{2i}, \ldots, x_{ki}$ represent the different levels of factors. In order to test if there were any significant one-factor or two-way interaction effects, the null hypothesis that all β_k's equal zero or alternatively that at least one does not equal zero, was used in the analysis (H_0: $\beta_2 = \beta_3 = \ldots = \beta_k = 0$, H_a: at least one $\beta_k \neq 0$). The test statistic used was the Wald Chi-Square and the p-values indicated the significance level for the factors. For the individual regression models there were 531 students designated as JQMI out of 49,667 students designated as JQMA; again, those high school junior students who responded to the standardized form letter were considered to be a JQMI student. First, one-factor regression models were run on each of the initially selected binary variables; PLANS, TMO, TSER, and REGION.

For the students' future intentions, the variable that indicated a positive propensity to enlist was used as the reference variable for the first routine. This regression model found no significant difference in the likelihood of enlisting between a student's undecided intentions, her plans to join the work force, or her propensity to enlist (the Wald Chi-Square p-values > 0.16). However, students who anticipated attending college or receiving some form of continued education were less likely to be interested in joining the armed forces than the reference group (p-values = 0.0001). Appendix C presents the logistic regression procedure (as generated by SAS Version 6.07 on the mainframe computer) for all the individual junior population regression models.

The next routine focused on the variable TMO or the month the student took the military exam. This variable was categorized by seasons, Fall being the reference season. It was thought that students may be less likely to be interested in the military as the academic year progressed and their future plans became more clear. However, this regression model showed that the time of year a student took the AFQT was not a significant factor in assessing the likelihood of a student's interest or non-interest in the military (p-values > 0.11)

It was of concern to determine if the student's likelihood of interest in the military may be based on her service preference. High school junior students who selected the Navy as their service preference was used as the reference group for the individual regression model. This model indicated a student's service preference was not significant in evaluating the likelihood of being interested in the military (p-values > 0.43).

The final one-factor regression analysis centered on a student's geographic area with students who live in the western region used as the reference group. This regression model indicated that the likelihood of being interested in the military for high school students from the Southeast was not significantly different from students living in the West (p-value = 0.4877). This model indicated that students from the Northeast and Midwest (as compared to those from the West) were less likely to be interested in the military (p-values = 0.0001).

Individual one-factor regression models indicated that a student's future plans and her geographic area were of significance when assessing her likelihood of being

interested in the military. A series of two-way interaction effect regression models were used to determine the student's likelihood of being interested in the military. These regression models examined the interaction effects between a student's future plans and time of year the AFQT was administered, between her future plans and geographic area, and between her service preference and geographic area.

High school junior students who indicated that their future plans included enlistment in the military and who took the AFQT during the Fall or Winter months were used as the reference group for this first regression model. This regression model found high school junior students who took the exam in the Spring or Summer months and who intended to join the military were not significantly different when determining their likelihood of being interested in the military from the reference group (p-value = 0.9846). Those high school junior students who did not intend to join the armed forces, regardless of when the AFQT was administered, were less likely to be interested in the military (p-values $\leq$ 0.0034). Therefore, it can be concluded there was no significant interaction effect between a student's future intentions to enlist in the military and time of year the AFQT was administered when determining her likelihood of being interested in the military.

The next routine was designed to determine if the interaction effect between geographic area and her future intentions had an impact on her likelihood of being interested in the military. The reference was those students from Region 8 (West) who planned to enlist in the military. This regression model indicated there was no significant difference in the likelihood of being interested in the military between

students who intended to join the military, regardless of area (p-values > 0.10). However, high school junior students from Region 1 (the Northeast) who did not intend to enlist were the least likely to be interested in the military (p-value = 0.0001). Students from the Midwest who did not desire to enlist were also less likely than students from the West to be interested in the military (p-value = 0.0001).

The last regression model for the population of high school junior students investigated at the interaction effect between a student's service preference and her geographic area. The reference group for this regression model was Region 8 (western states) students who preferred the Navy as their choice of military service. The regression model found students from Region 3 (Southeast region) were not significantly different in the likelihood of being interested in the military from those western region high school students whose service of choice was the Navy. This observation was also true for western region students who selected a non-Navy service preference. But, students from the Midwest, regardless of service preference, were least likely to be interested in the military. Students from the South Central states who indicated the Navy as their service preference were less likely to be interested in the military than their counterparts who indicated a non-Navy service preference. It can be concluded that high school junior students from the Northeast, Midwest, and the South Central states are less likely to be interested in the Navy than students from the West.

In sum, for the population of high school juniors, the regression models found there was not an interaction effect between a student's future plans and time of

year the AFQT was administered when determining a student's likelihood of being interested in the military. Students who indicated a positive propensity to enlist, regardless of region, were not significantly different in their likelihood of being interested in the military from those in Region 8 (western region). However, the findings indicated northeastern region high school juniors with a negative propensity to enlist appeared to be the least likely to be interested in the military. For students from the southeastern states, regardless of service preference, their likelihood of being interested in the military was not significantly different from that of western region students'. Appendix C summarizes the results of the logistic regression models. Next, the analysis turns to the senior population focusing on the individual regression models.

2. The Senior Population (SQMI)

As in the individual regression model for the population of high school junior students, the basic model (as described in Chapter III), for the population of high school senior students is specified as follows:

$$\text{Logit (p)} = \beta_1 + \beta_2 x_{2i} + \ldots + \beta_k x_{ki} ,$$

where $x_{2i}, \ldots, x_{ki}$ represent the different levels of factors. For this model, there were only 95 high school senior students designated as senior qualified and interested in military service (SQMI) out of 21,925 students designated as qualified and available for military service (SQMA); again, those high school seniors who responded to the

standardized form letter were considered to be a SQMI student. Since there were so few responses, a Poisson regression model could have been used. In cases where the number of responses out of the number of trials is very small, the logistic regression model is the approximate form of the Poisson regression model and may be used. For this study, a logistic regression model was used. The Poisson regression model is specified as [Ref. 8:p.1120]:

$$\mu(x_i) = N(x_i)\, e^{\beta_1+\beta_2 x_{2i}+\dots+\beta_k x_{ki}} ,$$

where $\mu(x_i) = SQMI_i$ and $N(x_i) = SQMA_i$. Then by taking the natural log of both sides, the following equation was obtained:

$$\ln(SQMI_i) = \ln\,(SQMA_i) + \beta_1 + \beta_2 x_{2i} + \dots + \beta_k x_{ki} ,$$

so,

$$\ln\left(\frac{SQMI_i}{SQMA_i}\right) = \beta_1 + \beta_2 x_{2i} + \dots + \beta_i x_{ki} .$$

$$Let\ (p) = \left(\frac{SQMI_i}{SQMA_i}\right) ,$$

and recall that:

$$Logit\ (p) = \ln\left(\frac{p}{1-p}\right) = \beta_1 + \beta_2 x_{2i} + \ldots + \beta_k x_{ki} ,$$

and if the proportion of SQMI out of SQMA is very small then,

$$\ln\left(\frac{SQMI_i}{SQMA_i}\right) \approx logit\ (p) = \ln\left(\frac{p}{1-p_i}\right) .$$

Since the number of responses out of the number of trials was very small, a logistic regression model was used. It was used for the population of high school seniors in order to keep the results consistent for the population of high school junior and senior students.

As in the population of high school junior students, one-factor regression models were run on each of the initially selected binary variables; PLANS, TMO, TSER, and REGION. The results of the regression models were very similar to the results of the population of high school juniors. The results of the logisitic regression models may be found in Appendix D. Not surprisingly, the regression analysis found

a student's future plans and geographic area to be significant one-factor variables when determining the likelihood of interest in the military. Students who desired or planned to attend college or enroll in some form of continuing education were less likely to be interested in the military than those students who intended to enlist in the military. The individual regression model examining likelihood of interest in the military based on geographic area found that students from the Northeast and Southeast were not significantly more or less likely than students from the western region to be interested in the military. It was expected that students from the Northeast would be less likely to be interested in the military; however, this was not the case. Perhaps the time of the survey found senior students without clear plans and military service was more appealing now. The regression model found that students from the Midwest and the South Central states were less likely to be interested in the military than western region students.

Variables that did not prove to be significant when determining the likelihood of a student to be interested in the military, in the one-factor regression models, were time of month the AFQT was administered (TMO) and the student's preference of service (TSER). These regression models indicated that the likelihood of a student's interest in the military, it did not matter when a student took the AFQT nor which service she preferred. However, her future plans and area of the country indicated a difference in her likelihood of interest in the armed forces.

The same series of regression models used to determine the population of high school junior likelihood of interest in the military were also used to determine the

population of high school senior likelihood of interest in the military. The regression models examined interaction effects between a student's future plans and time of year the AFQT was administered, between her future plans and geographic area, and between her service preference and geographic area.

Students who intended to enlist in the military were likely to be interested in the military regardless of the time of year the AFQT was administered. Those students who did not intend to enlist were less likely to be interested in the military than students with positive plans, regardless of test time. It can be concluded there was no significant interaction effect between a student's future intentions and time of year the AFQT was administered. This was not surprising, since a student's future plans were a significant factor when assessing the probability that a randomly selected student ***i*** from the SQMA population was considered a SQMI student, when using one-factor regression models.

Along the same lines of logic, it was anticipated that students who expressed enlistment desires would be more likely to be interested in the military no matter where they are in the country. This expectation was confirmed; however, students from Region 1 (the Northeast), Region 3 (Southeast), and Region 8 (the West) with negative enlistment intentions were not significantly different in their likelihood of being interested in the military from the reference group (western region students with positive enlistment plans). It was expected that northeastern high school senior students would be less likely to be interested in the military than western region students; however, this was not the case. This finding may perhaps be the result that when a

high school senior took the AFQT during the academic year, she expressed a negative interest in the military because of her plans to attend college or join the work force; then, at the time of the mail campaign, she found that her plans changed and the military seemed more appealing. The individual regression model indicated high school seniors from the Midwest and South Central states were less likely to be interested in the military than students from the western region.

For students who lived in the Southeast, Midwest, and South Central states, regardless of a student's service preference, her likelihood of interest in the military was not significantly different from western region students who preferred the Navy as their service choice. Western region students who preferred a service other than the Navy were more likely to be interested in the military than their counterparts who preferred the Navy. Surprisingly, northeastern students who preferred the Navy were more likely to be interested in the military than students in the western states.

For the population of high school senior students, the regression models found no interaction effect to be present between a student's future plans and the time of year the AFQT was administered (when determining her likelihood to be interested in the military). High school senior students who intended to enlist in the military, regardless of their region, were not significantly different in their likelihood to be interested in the military from students in the western region. For a high school student living in the Midwest or South Central states who did not intend to enlist, she was less likely to be interested in the military than a student from the West. When determining a student's likelihood of being interested in the military, the regression model found

students who lived in the Southeast, Midwest, and South Central states were not significantly different from students in the western region, regardless of their service preference. However, northeastern students who preferred the Navy as their service of choice were found to be more likely to be interested in the military than western region students. Again, these results may be found in Appendix D.

3. Junior Population vs. Senior Population (JQMI vs. SQMI)

Comparing the two populations of students likely to be interested in the military, interaction effects between a student's future plans and geographic area, and between her service preference and geographic area were common to both populations. The main difference between the populations of qualified and interested students was the senior students from the northeastern region were more likely to be interested in the military than their junior high school student counterparts. This may be because at the time of the survey, many perceived opportunities (further education, work force intentions) may have come and gone. For the population of high school senior students, the military may now have been a viable option and was noted by the proportion of positively propensed students in this region. For the population of high school junior students, the likelihood of being interested in the military was not significantly different for southeastern students (regardless of service preference) than western region students who preferred the Navy as their service of choice. In contrast, when determining a high school senior student's likelihood to be interested in the military, there was not a significant difference between a student's likelihood from the western region and a student from other regions, regardless of her service preference.

The next analysis will focus on selecting characteristics of individual NRDs for the high school junior and senior population.

4. Junior Population (NRD Characteristics)

The models used in selecting characteristics for each NRD were similar to those used in selecting individual characteristics. However, when interpreting the analysis, the response variable represents the observed number of responses in NRD *i* out of the number of standardized form letters mailed to high school students in NRD *i*. For the first regression model, there were 521 high school students who were designated as a junior high school student qualified and interested in military service (JQMI) and 49,217 students who represented the population of junior high school students qualified and available for military service (JQMA: students who met the pre-established standards). In addition to the JQMA population, there were 828,440,000 females designated as the target market population (females aged 17-21 years). The second regression model attempted to select NRD characteristics for students who qualified for non-traditional rates in the Navy out of the target market population (referred to as TOTAL).

First, the results of the regression model addressing students interested in the military out of those who were qualified and available for technical rates were examined. The only significant predictor variables for this regression model were the number of personnel in the armed forces (ARMF) in individual NRDs, and the median family income (MDFAMINC) in individual NRDs. The variable delineating the unemployment rate in each NRD was initially included in the regression model but was

removed because it was not significant (p-value > 0.05). Other variables, for each NRD initially included in the regression model but also removed due to insignificance included the number of single parents, the number of people with an education attainment level above a high school education, the number of veterans, the number of people associated with technical occupations, and the number of people existing below the poverty level. A dummy variable representing the regions of the Navy Recruiting Command was included in the regression model and the students residing in Region 8 (West) were used as the reference group. The final regression model was specified as follows (p-values in parenthesis):

$$\mathit{logit}\left(\frac{JQMI_i}{JQMA_i}\right) =$$

$$\underset{(0.0001)}{-\,5.4541} + \underset{(0.0343)}{1.482E\text{-}8ARMF_i} + \underset{(0.0160)}{0.000031MDFAMINC_i}$$

$$-\,\underset{(0.0002)}{0.7262REGION1} + \underset{(0.1095)}{0.2245REGION3} - \underset{(0.0051)}{0.4576REGION5}$$

$$-\,\underset{(0.3212)}{0.1730REGION7.}$$

This regression model can be interpreted as the number of personnel in the armed forces per NRD increased, the predicted probability of the proportion of those high school junior students likely to be interested in the military out of those qualified and available increased. As the median family income increased, the proportion of students

likely to be interested in the military increased. In other words, out of those students qualified for technical rates, interest in the military increased with median family income. The predicted probability of the proportion of students interested in the military who reside in the Northeast and Midwest was less than for those students living in the western states. There was no significant difference for the predicted probability of the proportion of high school junior students from the South Central states interested in the military from western region students. However, the probability of southeastern high school students interested in the military was greater than those students from Region 8 (West). Appendix E presents the results of this regression model. This appendix also contains a graphical presentation of the proportion of students who responded to the mail campaign out of those who received the standardized from letter versus the predicted proportion of students interested in the military based on the regression model.

A second regression model, which addressed the proportion of the population of high school junior students qualified and available for technical rates in the Navy out of the target market population (referred to as TOTAL) in NRD *i* was specified as follows (p-values in parenthesis):

$$logit\left(\frac{JQMA_i}{TOTAL}\right) =$$

$$- 3.6885 - 17.0165UNEMP_i + 1.276E\text{-}8NONADMIN_i$$
$$\quad (0.0001) \qquad (0.0001) \qquad\qquad (0.0001)$$

$$- 0.00014MDFAMINC_i - 2.63E\text{-}7BLPOV_i + 0.0756REGION1$$
$$\quad (0.0001) \qquad\qquad (0.0001) \qquad\qquad (0.0001)$$

$$+ 0.3679REGION3 + 0.5936REGION5 - 0.1784REGION7.$$
$$\quad (0.0001) \qquad\qquad (0.0001) \qquad\qquad (0.0001)$$

This model indicated as the unemployment rate (UNEMP) increased, the predicted probability of the proportion of students qualified and available for technical rates decreased. Perhaps one explanation for this observation is that students are more concerned with finding employment rather than pursuing education. The second variable, NONADMIN, represented the number of people in each NRD that were associated with technical occupations. As the number of this type of personnel increased, the proportion of students qualified and available for the military increased; this may be due to an influence on study habits or ambitions that these individuals have on high school students. The third variable, MDFAMINC, indicated that as the median family income increased per NRD, the proportion of high school junior students qualified and available for military service decreased. One possible explanation may be that this group has more disposable income and would "rather be sailing" than studying and is not interested in broadening her academic background! As the number of people existing below the poverty level (BLPOV) per NRD increased, the proportion of students qualified for the technical rates in the military decreased. This result was expected, because this group is most likely more concerned with "surviving" rather than

expanding academic horizons. Also, the dummy variable representing geographical area produced expected results. The results from the regression model indicated students from northeastern, midwestern, and southeastern regions had a higher predicted probability of being qualified for non-traditional rates than western region students. The results also indicated students from the South Central region had a lower predicted probability of qualification for technical rates. Appendix E contains the results of this model, as well as the predicted proportion of high school junior students qualified and available for military service using the model developed. This appendix also includes a graphical presentation of the actual proportion of students qualified out of the target market population versus predicted proportion of high school juniors qualified.

5. Senior Population (NRD Characteristics)

In the population of high school senior students, there were only 95 students designated as a senior qualified and interested student (SQMI) out of 21,811 students who represented the population of senior high school students qualified and available for military service (SQMA: students who met pre-established standards). This was a much smaller than the population of high school juniors. The target market population represented 828,440,000 females aged 17-21 years. The method used to analyze the population of high school seniors was the same as were completed for the population of high school juniors. The first regression model attempted to determine significant characteristics of the population of students interested in the military out of the population of high school students qualified and available for military service. The

second regression model looked at the characteristics of students who were qualified for technical rates out of the target market population.

Turning to the first regression model, the proportion of students interested in the military out of those qualified for non-traditional rates, the results showed the significant variables for the NRDs were the number of single parents, the number of people associated with technical occupations, the number of personnel in the armed forces, and median family income. The dummy variable representing geographic area was not significant and therefore, removed from the regression model. The final regression model was specified as follows (p-values in parenthesis):

$$logit\left(\frac{SQMI_i}{SQMA_i}\right) =$$

$$\underset{(0.0001)}{-\,7.7746} \; - \; \underset{(0.0322)}{6.98E\text{-}8ONEPRNT_i} \; + \; \underset{(0.0335)}{2.701E\text{-}8NONADMIN_i} \; + \; \underset{(0.0176)}{3.192E\text{-}8ARMF_i}$$

$$+ \; \underset{(0.0192)}{0.000069MDFAMINC_i}.$$

This regression model showed as the number of single parents per NRD increased, the predicted probability of the proportion of those high school senior students interested in the military out of those qualified and available for military service decreased. As the number of people per NRD in technical occupations (NONADMIN) increased, the

proportion of students interested in the military increased; again this could be due to this type of person influencing study habits or ambitions of senior students. The third variable, ARMF, indicated as the number of personnel in the armed forces per NRD increased, the proportion of students interested in the military increased. As seen in the junior population, as the median family income increased, the proportion of students interested in military service increased. Appendix F presents the results from this regression model. It also contains a graphical representation of the actual proportion of high school students interested in the military out of those qualified and available versus the predicted proportion of students interested in the military.

The second regression model attempted to predict NRD characteristics of the high school senior students who were qualified and available for technical rates in the military out of the target market population (referred to as TOTAL) was specified (p-values in parenthesis):

$$logit\left(\frac{SQMA_i}{TOTAL}\right) =$$

$$\underset{(0.0001)}{-\,5.2287} \;\; \underset{(0.0001)}{-\,7.9990UNEMP_i} \;\; \underset{(0.0001)}{+\,3.34E\text{-}8ONEPRNT_i} \;\; \underset{(0.0001)}{-\,0.00013MDFAMINC_i}$$

$$\underset{(0.0001)}{-\,0.3430REGION1} \;\; \underset{(0.0001)}{+\,0.4210REGION3} \;\; \underset{(0.0001)}{+\,0.1979REGION5}$$

$$\underset{(0.0001)}{+\,0.2688REGION7} \;\; \underset{(0.0001)}{-\,2.69E\text{-}7BLPOV_i}\;.$$

Again, as the unemployment rate (UNEMP) increased, the predicted probability of the proportion of students qualified for technical rates in the military out of the target market population decreased. The predicted probability of the proportion of students qualified for technical rates increased as the number of single parents (ONEPRNT) increased. Similar to population of high school junior student regression model, as the median family income (MDFAMINC) increased, the proportion of students qualified for non-traditional rates decreased. As the number of people existing below the poverty level (BLPOV) per NRD increased the proportion of students qualified for military service decreased. This was an expected result; for the same reason as the junior population - this group is most likely more concerned with "survival" rather than education prospects (therefore not qualifying for technical rates). The dummy variable which indicated geographic area, indicated the northeastern students had a lower predicted probability of being qualified for technical rates than western region students. Appendix F presents the results from this regression model. This appendix also contains a graphical representation of the actual proportion of high school senior students qualified and available for military service out of the target market population versus predicted proportion of students qualified and available for technical rates.

6. Junior versus Senior NRD Characteristics

When comparing the characteristics found to be significant in each regression model per NRD, the number of personnel in the armed forces and the median family income were significant for both the junior and the senior population regression models addressing the students interested in the military out of those available. For the high

school junior population regression model, geographic area was significant - students from the Southeast were more interested in the military than the students from the West. However, for the high school senior population regression model addressing interest in the military, the dummy variable representing geographic area was not significant. But, the number of single parents and the number of people in technical occupations were significant variables in this regression model.

For the regression model addressing the proportion of students qualified and available out of the target market population, the common significant predictor variables per NRD, included unemployment rate, the number of people existing below the poverty level, and median family income. For the high school junior regression model addressing the proportion of students available for technical rates, the number of people associated with technical occupations was a significant predictor variable. The dummy variable representing region produced expected results - the students from the southeastern and South Central states were less likely to be qualified for military service than students from the western region. For the high school senior regression model which addressed the proportion of students available for technical rates, the number of single parents was the significant variable unique to this model. The geographical dummy variable indicated northeastern high school senior students had a lower predicted probability of the proportion of those of being qualified for technical rates out of the target market population than western region students.

V. CONCLUSIONS

The purpose of this thesis was to attempt to select significant individual characteristics of high school students who met Navy Recruiting Command standards for enlisting in technical rates. Additionally, it attempted to select Naval Recruiting District characteristics of these qualified students. To that end, a logistic regression analysis was conducted on the approximately 100,000 qualified high school juniors and seniors.

For a student to be qualified for this study, she must have scored above the 31st percentile on the AFQT and above the 50th percentile on one of three technical subtests: Auto-Shop Information, Electronics Information, or Mechanical Comprehension. The names of these qualified students were merged with Military Entrance Processing Command files, as well as 1990 Census data, and was the database from which characteristics were selected.

For the population of high school juniors, significant interaction effects for the individual models were present between a student's future plans and geographical area, and between her service preference and geographic area. When determining the likelihood of being interested in the military, students with positive enlistment intentions, regardless of the region, were not significantly different from western region students. Students with negative enlistment intentions from the Northeast were the least likely to be interested in the military. Students from the southeastern states, regardless

of service preference, were not significantly different in their likelihood to be interested in the military than western region students. Significant NRD characteristics included the number of personnel in the armed forces, median family income, unemployment rate, the number of people associated with technical occupations, the number of people existing below the poverty level, and geographic area. For the regression model addressing the proportion of students interested in the military out of those qualified and available, it was found that as the number of personnel in the armed forces and the median family income increased, the predicted probability of the proportion of students interested in the military increased. As the unemployment rate and the number of people existing below the poverty level increased, the proportion of students qualified and available for military service out of the target market population decreased.

The individual regression models for the population of high school senior students indicated interaction effects were present between a student's future plans and geographical area, and between her service preference and geographic area. Students with positive enlistment intentions students, regardless of their geographic area, were not significantly different in their likelihood to be interested in the military. Students with negative enlistment intentions from the midwestern and South Central states were less likely to be interested in the military than students from the western region. The likelihood of being interested in the military for high school senior students residing in the southeastern, midwestern, and South Central states, regardless of their service preference, was not significantly different from western region students preferring the Navy as their service of choice. However, high school senior students from the

Northeast were as likely to be interested in the military as students from the western region. For the proportion of high school seniors interested in the military out of those available per NRD, the significant predictor variables included the number of personnel in the armed forces, the number of single parents, the number of people associated with technical occupations, and median family income. For the regression model addressing the proportion of students qualified and available for military service, the significant NRD characteristics included unemployment rate, median family income, the number of single parents, the number of people existing below the poverty level, and geographic area. Table 4.1 summarizes the results of the individual logistic regression models. Table 4.2 summarizes the results of the Naval Recruiting District logistic regression models.

Table 4.1 STATISTICALLY SIGNIFICANT RESULTS OF INDIVIDUAL REGRESSION MODELS

INDIVIDUAL MODELS:	
Interest in the military based on future plans by region:	
Juniors:	Seniors:
Less likely:	Less likely:
Northeast	Midwest
Midwest	South Central
Interest in the military based on service preference by region:	
Juniors:	Seniors:
Less likely:	Less likely:
Northeast	Northeast
Midwest	

Table 4.2 STATISTICALLY SIGNIFICANT RESULTS OF NRD REGRESSION MODELS

NRD MODELS:	
Proportion Interested (Junior):	Proportion Interested (Senior):
Interest increased:	Interest increased:
the more military in area	same as junior model
the higher median family income	same as junior model
more students from Southeast	more people in tech jobs
Proportion Available (Junior):	Proportion Available (Senior):
Availability decreased:	Availability decreased:
the higher unemployment rate	same as junior model
the higher median family income	same as junior model
the more people below poverty level	same as junior model
more students from South Central	more students from Northeast

Recalling the results from previous studies, it is of interest to compare outcomes. The Report to Congress [Ref. 5] concluded that age, level of education, level of income, and employment rate were significant factors in propensity to enlist. As these factors increased, propensity to enlist decreased. RAND Corporation [Ref. 6] concluded that labor related variables had a smaller effect on enlistment of women. Women who plan to marry were less likely to enlist; education related variables, family income, number of siblings, mother's education or work history, and employment variables had an effect on enlistment. Again, these previous studies focused on females aged 17-21 years, not those qualified for technical rates by pre-established standards.

This study focused on female high school junior and senior students who met Navy Recruiting Command standards for non-traditional, technical rates in the Navy. The study found that unemployment rate, median family income, the number of personnel in the armed forces per NRD, the number of persons associated with technical occupations, the number of single parents, the number of people existing below the poverty level, and geographic area were significant characteristics when determining interest in the military (Navy), and when determining the proportion of students qualified and available for military service.

It is hoped that the information in this study enables the Navy Recruiting Command to more effectively market recruit "rich" areas and increase the percentage of qualified women in technical rates in the Navy. Future studies may include follow-on analyses to determine which of these high school students actually enlisted and if their characteristics are the same as the population of high school students in this study. These models or the results of these models may be used in part to aid in developing goaling models used by the Navy Recruiting Command to determine future goals for recruiting qualified women.

APPENDIX A. MAIL CAMPAIGN

Dear High School Senior,

Over the years, it's gotten harder and harder for high school graduates to find jobs, much less jobs that offer a future. And this year, it isn't going to get any easier. Today, even college graduates are finding themselves unemployed.

That's a good reason to look into the high-tech job opportunities now available to women in the Navy. Unlike our civilian counterparts, we have plenty of job openings, especially in the areas of engineering, aviation, electronics and communications.

And the best part is, you don't need previous experience to apply. We'll not only train you for an exciting, high-tech career, we'll even pay you a full salary as you learn.

When you work for the Navy, you'll also enjoy benefits no civilian employer can match:

* 30 days' paid vacation earned every year
* Free medical and dental care
* Housing and shopping discounts
* Up to $25,200 in educational assistance, if you qualify
* Excellent pay and allowances, with regular raises
* Travel

In the Navy, how far you go doesn't depend on whether you're a man or a woman. It depends on you. Here good work is rewarded, no matter who does it.

So why settle for a dead-end job, when you can get one that offers you all the training and experience you'll need for a high-tech career with a great future?

Send for your free copy of our book, <u>Today's Navy</u>. It will tell you more about the job opportunities, specialized training, and educational benefits available to you when you become part of the Navy. Don't worry, there's no obligation...just the chance to get a job with a future, both in the Navy and beyond.

Sincerely,

H J Zinser

H.J. Zinser
Captain, U.S. Navy

The Navy uses commercial mailing lists in its recruiting efforts. Such lists sometimes contain errors which cannot be identified before we mail. If you should not have received this letter, please accept our apologies. Perhaps you could pass this information on to someone who might be interested in Navy opportunities.

EF92-A

Figure 1: Junior Letter

If you're looking for a high-tech job with a future, the NAVY has thousands of openings.

Dear Recent Graduate,

Now that you've graduated from high school, you may be experiencing just how hard it is to find a job, much less a job that offers a future. Unfortunately in today's economy, it doesn't look like it's going to get any easier. Even college graduates are finding themselves unemployed.

That's a good reason to look into the high-tech job opportunities now available to women in the Navy. Unlike our civilian counterparts, we have plenty of job openings, especially in the areas of engineering, aviation, electronics and communications.

And the best part is, you don't need previous experience to apply. We'll not only train you for an exciting, high-tech career, we'll even pay you a full salary as you learn.

When you work for the Navy, you'll also enjoy benefits no civilian employer can match:

- 30 days' paid vacation earned every year
- Free medical and dental care
- Housing and shopping discounts
- Up to $25,200 in educational assistance, if you qualify
- Opportunities for advancement
- Excellent pay and allowances, with regular raises
- Travel

In the Navy, how far you go doesn't depend on whether you're a man or a woman. It depends on you. Here good work is rewarded, no matter who does it.

So why settle for a dead-end job, when you can get one that offers you all the training and experience you'll need for a high-tech career with a great future?

Send for your free copy of our book, Today's Navy. It will tell you more about the job opportunities, specialized training, and educational benefits available to you when you become part of the Navy. Don't worry, there's no obligation...just the chance to get a job with a future, both in the Navy and beyond.

Sincerely,

H J Zinser

H.J. Zinser
Captain, U.S. Navy

The Navy uses commercial mailing lists in its recruiting efforts. Such lists sometimes contain errors which cannot be identified before we mail. If you should not have received this letter, please accept our apologies. Perhaps you could pass this information on to someone who might be interested in Navy opportunities.

EF92-B

Figure 2: Senior Letter

Join the NAVY and get the training and job experience you need to enjoy a bright future in a high-tech career.

Last year thousands of women looked to the Navy and found career opportunities that offered them jobs with a future — high-tech positions they wouldn't have gotten in the civilian job market unless they had years of experience.

High-tech jobs. No experience necessary.

One of the advantages of starting your career with the Navy is that you don't need any experience at all to qualify for a job in engineering, electronics, aviation, even communications. The Navy will train you and pay you a full salary complete with benefits.

A benefits package no other employer can match.

Here's another big advantage to consider when you're working for the Navy. Benefits — and lots of them. You start with 30 days' paid vacation earned every year. Plus you get free medical and dental care — housing and shopping discounts — excellent pay and opportunities for advancement — regular raises — and even travel.

We'll give you money for college.

If you'd like to continue your education, there's the Navy College Fund. In combination with the Montgomery GI Bill, this fund can help you get up to $25,200 toward college expenses, if you qualify.

In the Navy, your opportunities are wide open — because how far you go doesn't depend on whether you're a man or a woman. It depends on you and what you do.

Free career book.

Why not find out more about the career opportunities that are waiting for you in the Navy? Send for our free book, *Today's Navy*...and learn all about the job opportunities, special training and educational benefits available to you. You'll find that when it comes to getting a promising, high-tech career, the Navy can help you move. Full speed ahead.

Figure 3: Standardized Letter Insert

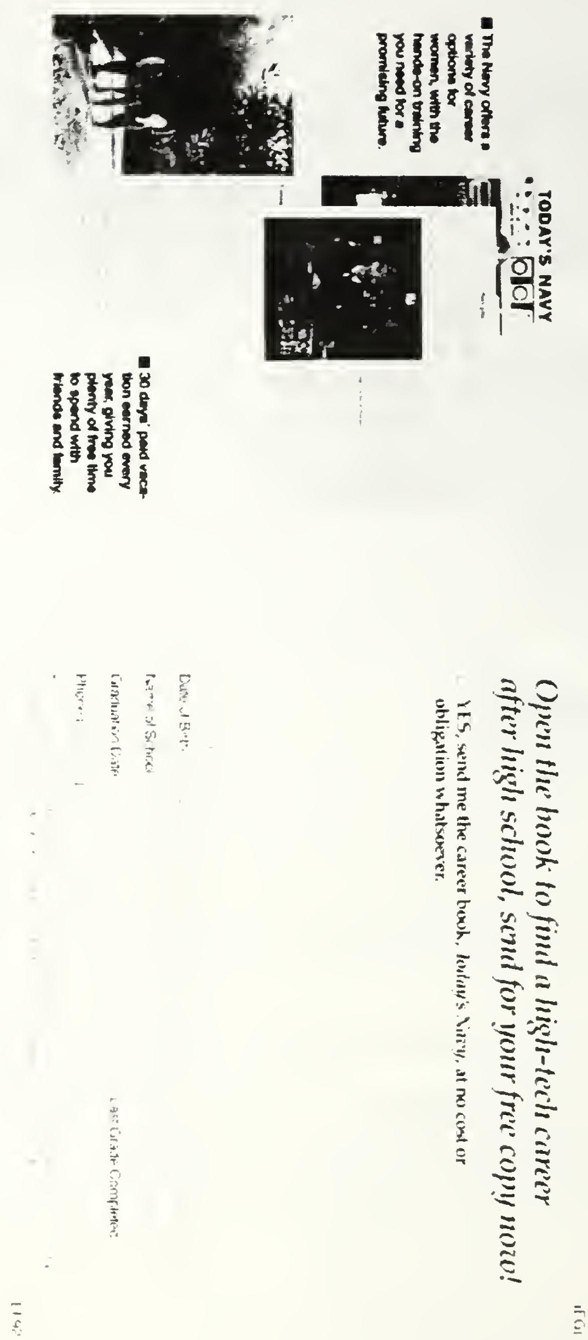

Figure 4: Response Card

APPENDIX B. PRELIMINARY ANALYSIS

Table B.1A JQMI AND JQMA INFORMATION

NRD	NRD NAME	QMI	QMA	TOTAL	QMI/QMA	QMA/TOTAL
102	Boston	10	1644	33771086	0.006082725	0.0000486807
103	Buffalo	13	2076	16610421	0.006262042	0.0001249818
104	New York	4	414	50768607	0.009661836	0.0000081546
119	Philadelphia	8	586	32449434	0.013651877	0.0000180589
120	Pittsburgh	8	1918	14648630	0.004171011	0.0001309337
310	Montgomery	24	1865	5734056	0.012868633	0.0003252497
312	Jacksonville	30	1682	7708485	0.01783591	0.0002182011
313	Atlanta	30	2063	8530633	0.014541929	0.0002418343
314	Nashville	30	3168	6812918	0.009469697	0.000464999
315	Raleigh	26	1761	6715634	0.014764338	0.0002622239
316	Richmond	20	1242	6745402	0.01610306	0.0001841254
348	Miami	18	1499	24263042	0.012008005	0.0000617812
517	Cleveland	4	607	7649226	0.006589786	0.0000793544
518	Columbus	7	1314	8769603	0.005327245	0.0001498357
521	Chicago	7	655	53013995	0.010687023	0.0000123552
522	Detroit	17	1457	17895767	0.011667811	0.0000814159
528	Minneapolis	16	1973	7084750	0.008109478	0.0002784855
529	Omaha	12	2151	4974721	0.005578801	0.0004323861
542	Indianapolis	5	929	4211823	0.005382131	0.0002205696
559	Milwaukee	8	1222	5002954	0.006546645	0.0002442557
724	St. Louis	8	967	4601265	0.008273009	0.0002101596
727	Kansas City	8	1064	4752019	0.007518797	0.0002239048
731	Dallas	7	920	20096425	0.007608696	0.0000457793
732	Houston	6	717	32178013	0.008368201	0.0000222823
733	Little Rock	16	2046	5467352	0.007820137	0.0003742214
734	New Orleans	11	1438	4952765	0.007649513	0.0002903429
746	San Antonio	8	670	13634050	0.011940299	0.0000491417
747	Memphis	13	1288	419555	0.010093168	0.0030699193
825	Denver	14	1012	4784856	0.013833992	0.0002115006
830	Albuquerque	9	1044	10812813	0.00862069	0.0000965521
836	Los Angeles	22	1352	289527558	0.016272189	0.0000046697
837	Portland	24	1990	6674089	0.012060302	0.000298168
838	San Fran	22	1503	31964139	0.014637392	0.0000470214
839	Seattle	18	1529	10467608	0.0117724	0.0001460697
840	San Diego	38	1972	61019490	0.019269777	0.0000323175

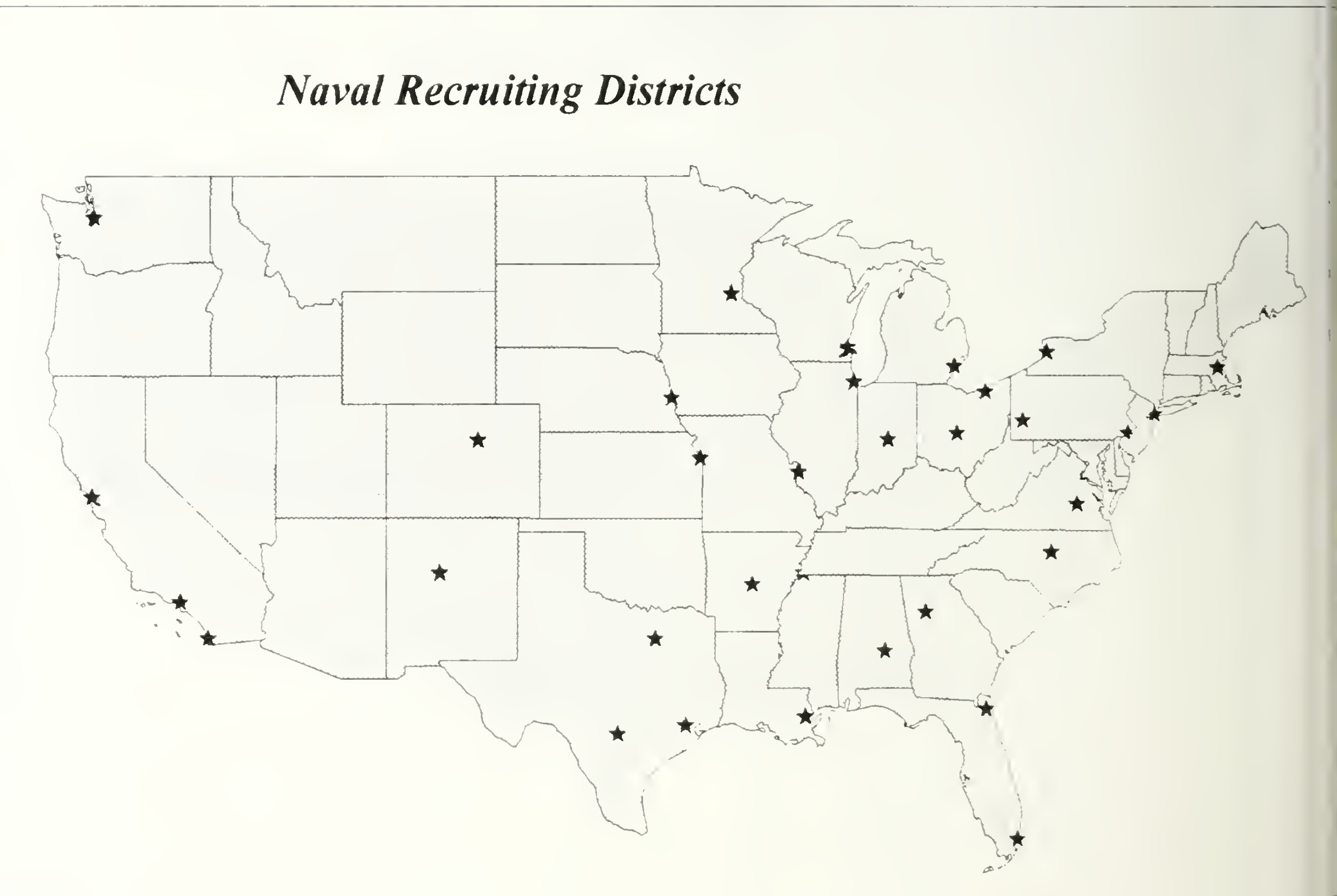

Figure 5: Naval Recruiting Districts

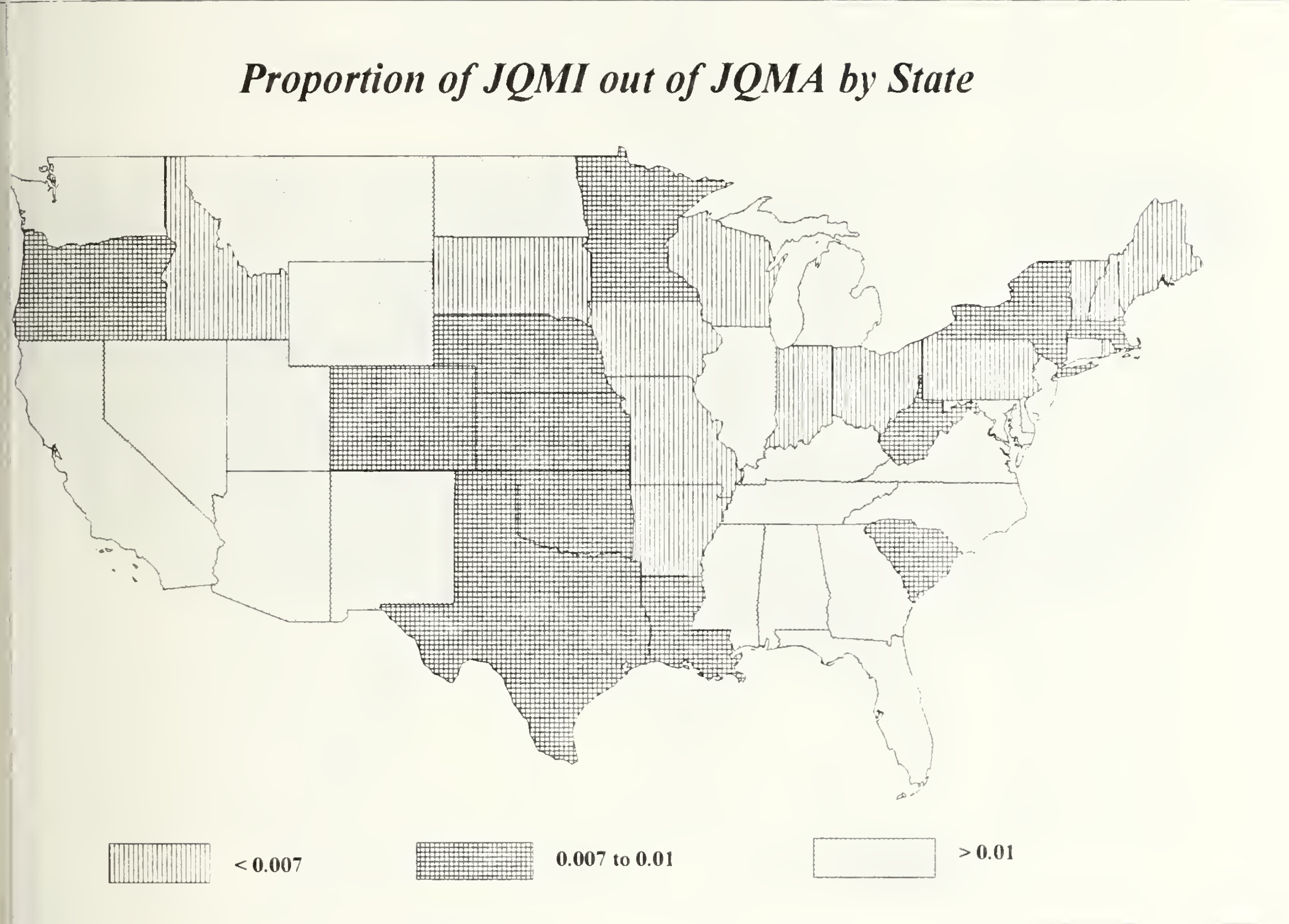

Figure 6: Proportion of JQMI out of JQMA by State

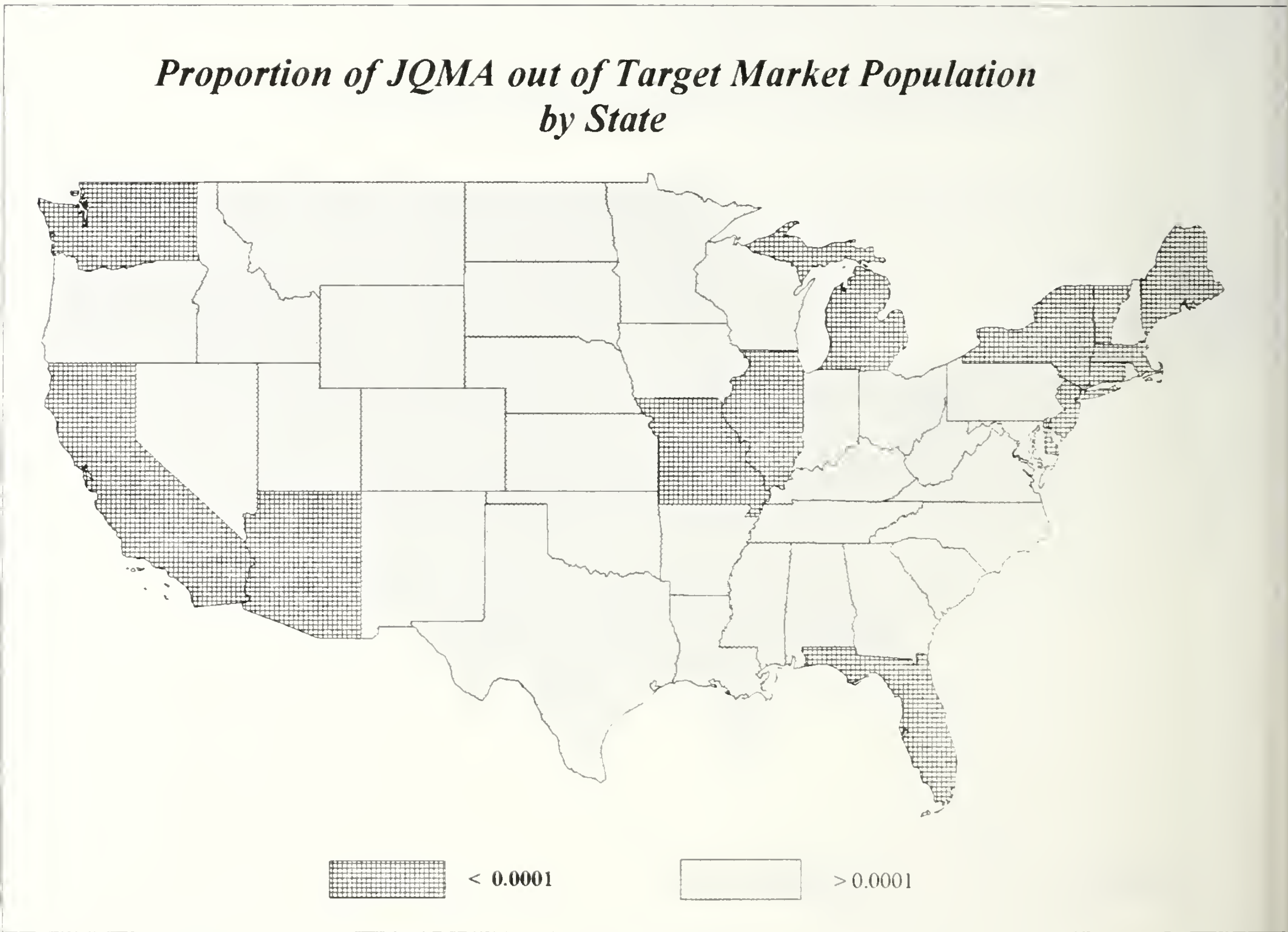

Figure 7: Proportion of JQMA out of Target Market Population by State

Table B.1B SQMI AND SQMA INFORMATION

NRD	NRD NAME	QMI	QMA	TOTAL	QMI/QMA	QMA/TOTAL
102	Boston	5	414	33771086	0.0120772947	0.00001225901
103	Buffalo	4	489	16610421	0.0081799591	0.00002943935
104	New York	1	268	50768607	0.0037313433	0.00000527885
119	Philadelphia	0	346	32449434	0	0.00001066274
120	Pittsburgh	4	643	14648630	0.0062208398	0.00004389489
310	Montgomery	6	560	5734056	0.0107142857	0.00009766211
312	Jacksonville	3	866	7708485	0.0034642032	0.00011234374
313	Atlanta	2	1062	8530633	0.0018832392	0.00012449252
314	Nashville	1	1082	6812918	0.0009242144	0.00015881594
315	Raleigh	9	820	6715634	0.0109756098	0.00012210314
316	Richmond	5	862	6745402	0.005800464	0.00012779075
348	Miami	2	668	24263042	0.002994012	0.00002753158
517	Cleveland	1	280	7649226	0.0035714286	0.00003660501
518	Columbus	0	536	8769603	0	0.00006112021
521	Chicago	2	310	53013995	0.0064516129	0.00000584751
522	Detroit	1	640	17895767	0.0015625	0.00003576265
528	Minneapolis	1	348	7084750	0.0028735632	0.00004911959
529	Omaha	0	520	4974721	0	0.00010452848
542	Indianapolis	1	257	4211823	0.0038910506	0.00006101871
559	Milwaukee	2	222	5002954	0.009009009	0.00004437378
724	St. Louis	1	590	4601265	0.0016949153	0.00012822561
727	Kansas City	0	559	4752019	0	0.00011763421
731	Dallas	1	929	20096425	0.0010764263	0.00004622713
732	Houston	3	608	32178013	0.0049342105	0.00001889489
733	Little Rock	1	1048	5467352	0.0009541985	0.00019168329
734	New Orleans	3	759	4952765	0.0039525692	0.00015324773
746	San Antonio	4	1097	13634050	0.0036463081	0.00008046032
747	Memphis	2	721	419555	0.0027739251	0.00171848745
825	Denver	1	305	4784856	0.0032786885	0.00006374278
830	Albuquerque	1	698	10812813	0.0014326648	0.00006455304
836	Los Angeles	7	638	289527558	0.0109717868	0.00000220359
837	Portland	0	570	6674089	0	0.00008540491
838	San Francisco	5	655	31964139	0.0076335878	0.00002049171
839	Seattle	4	793	10467608	0.0050441362	0.00007575752
840	San Diego	12	743	61019490	0.0161507402	0.00001217644

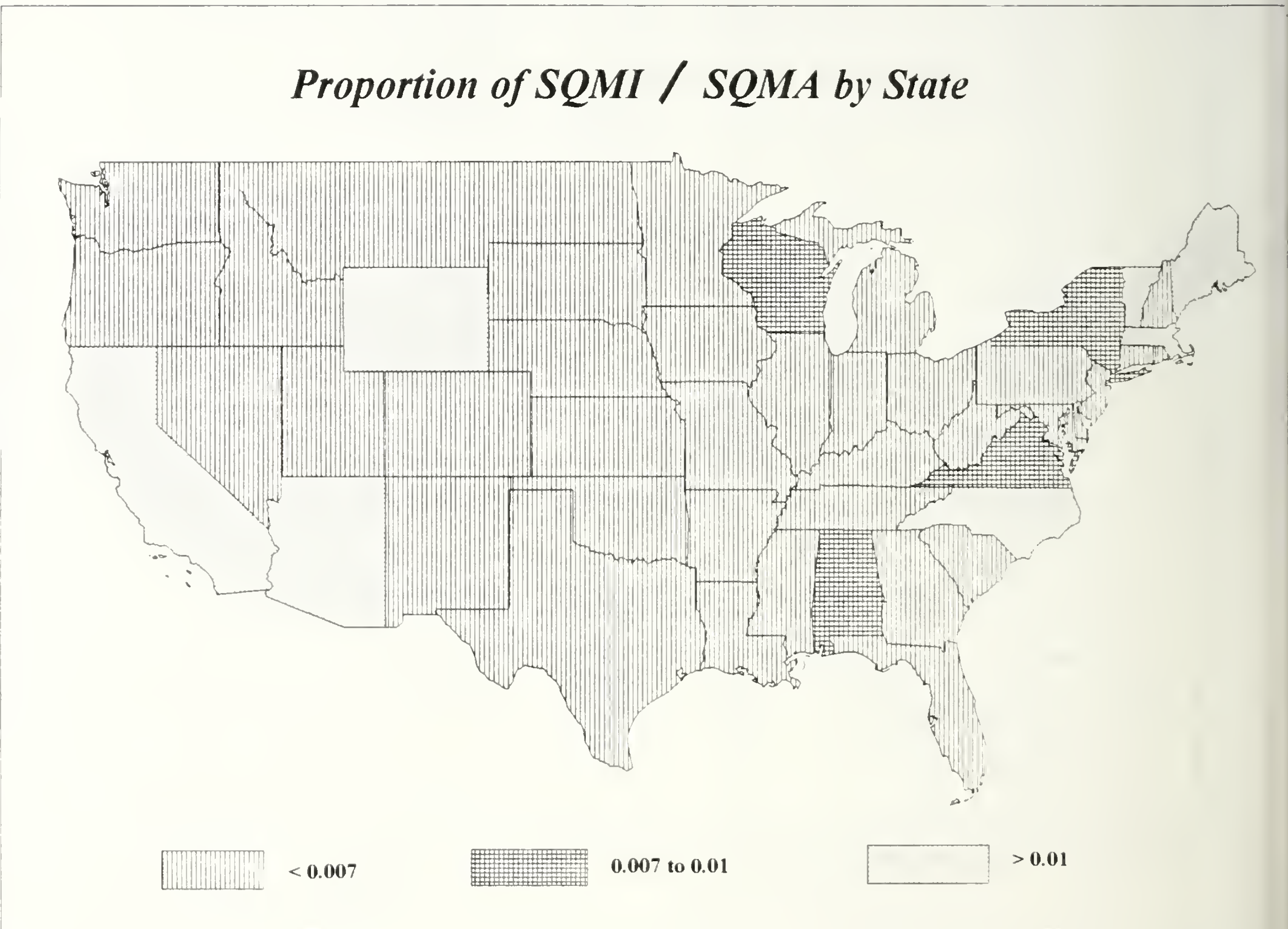

Figure 8: Proportion of SQMI out of SQMA by State

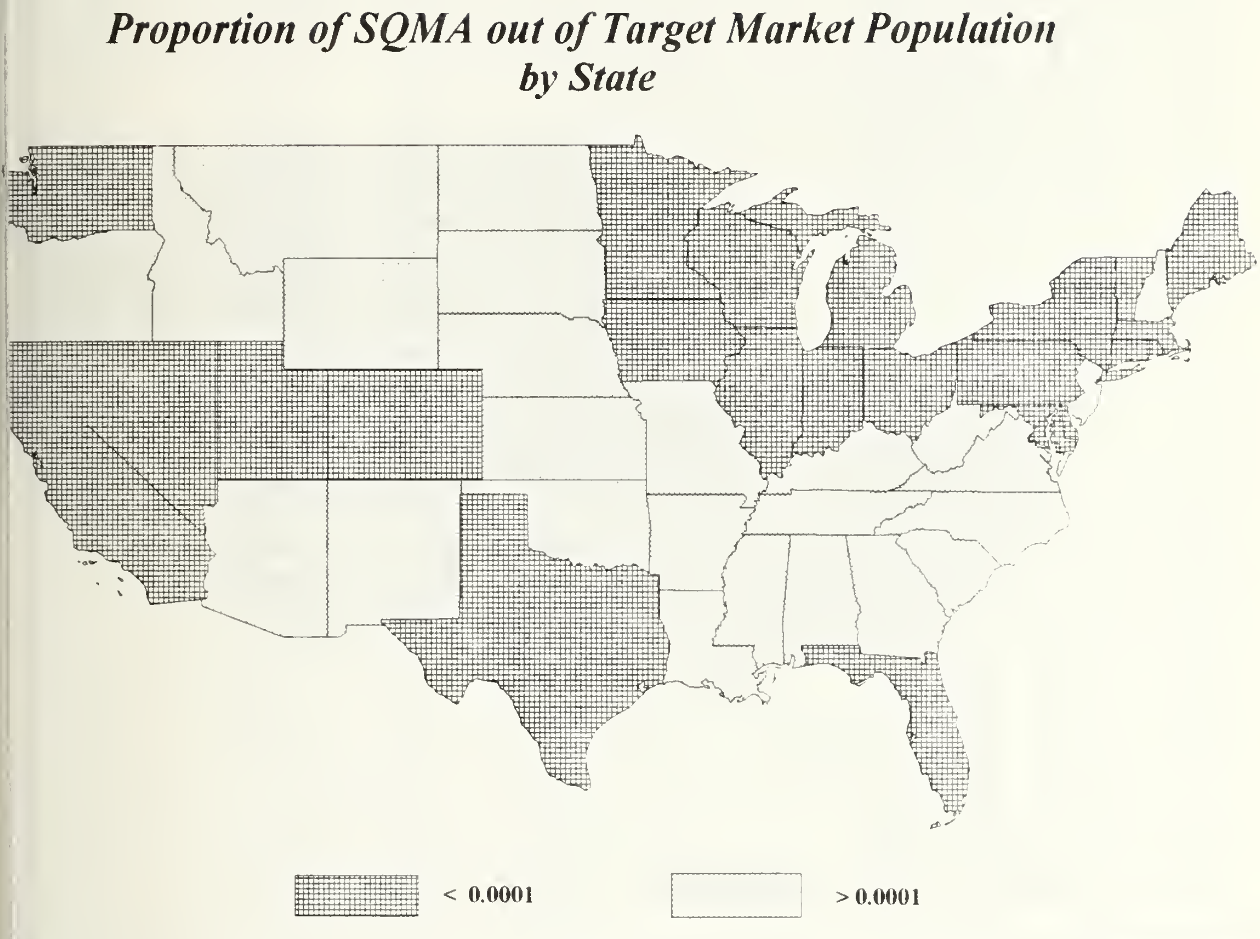

Figure 9: Proportion of SQMA out of Target Market Population

Table B.2 MEAN TEST SCORES (JUNIOR)

NRD	NRD NAME	AFQT	EI	AS	MC
102	Boston	68.67	46.37	44.83	52.15
103	Buffalo	69.04	46.95	45.25	52.45
104	New York	68.65	46.53	43.87	51.51
119	Philadelphia	67.86	46.72	44.61	52.17
120	Pittsburgh	67.17	47.58	45.41	51.67
310	Montgomery	63.56	46.86	44.45	51.03
312	Jacksonville	66.8	47.1	44.6	51.55
313	Atlanta	66.96	47.1	44.48	51.07
314	Nashville	65.32	46.69	44.74	51.43
315	Raleigh	66.28	47.63	44.75	51.05
316	Richmond	64.05	47.65	44.66	51.52
348	Miami	67.78	46.7	44.16	52.13
517	Cleveland	66.74	47.26	45.59	51.76
518	Columbus	66.06	46.89	44.76	51.67
521	Chicago	64.84	46.32	44.7	51.72
522	Detroit	65.46	46.42	45.45	52.71
528	Minneapolis	67.57	46.49	46.2	52.77
529	Omaha	68.68	46.8	46.22	52.95
542	Indianapolis	66	46.65	45.6	51.95
559	Milwaukee	67.84	46.82	45.54	52.98
724	St. Louis	65.95	47.24	45.98	51.73
727	Kansas City	67.18	46.82	46.36	52.5
731	Dallas	67.61	46.94	45.11	52.32
732	Houston	65.82	47	44.73	51.33
733	Little Rock	64.22	46.77	45.34	51.75
734	New Orleans	63.88	46.96	43.93	51.26
746	San Antonio	66.77	47.39	44.76	51.79
747	Memphis	63.8	46.29	44.35	50.95
825	Denver	66.93	46.41	46.19	52.64
830	Albuquerque	65.94	46.67	44.7	52
836	Los Angeles	67.64	45.14	43.69	52.69
837	Portland	66.72	45.55	45.33	53.37
838	San Francisco	66.67	45.83	44.82	52.59
839	Seattle	67.98	46.3	46.74	53.41
840	San Diego	67.29	46.04	44.73	52.21

Table B.3 FUTURE INTENTIONS (JUNIOR)

NRD	NRD NAME	4 YEAR COLLEGE	2 YEAR COLLEGE	VO TECH	MIL	WRK	UND
102	Boston	1189	84	16	73	14	266
103	Buffalo	1458	148	11	72	25	361
104	New York	327	9	2	16	4	56
119	Philadelphia	415	22	4	43	8	93
120	Pittsburgh	1390	142	28	73	21	364
310	Montgomery	1386	97	18	51	14	294
312	Jacksonville	1206	79	26	62	10	298
313	Atlanta	1593	59	67	63	17	263
314	Nashville	2407	147	47	75	24	464
315	Raleigh	1379	107	24	58	6	185
316	Richmond	902	56	12	69	14	188
348	Miami	1104	49	14	74	10	248
517	Cleveland	469	30	8	23	5	71
518	Columbus	949	63	8	40	13	240
521	Chicago	464	45	3	21	5	114
522	Detroit	1030	63	7	76	16	258
528	Minneapolis	1404	84	79	45	11	347
529	Omaha	1593	121	42	42	5	345
542	Indianapolis	644	48	23	25	15	171
559	Milwaukee	819	39	54	44	6	259
724	St. Louis	684	60	15	48	11	148
727	Kansas City	765	41	11	32	8	206
731	Dallas	698	31	2	33	5	149
732	Houston	539	31	4	34	10	99
733	Little Rock	1524	74	38	58	31	320
734	New Orleans	1140	38	18	43	15	183
746	San Antonio	504	26	5	31	5	96
747	Memphis	959	81	13	41	9	184
825	Denver	725	44	10	44	8	181
830	Albuquerque	808	37	6	38	9	146
836	Los Angeles	1027	93	4	43	8	175
837	Portland	1357	136	25	55	13	403
838	San Francisco	1028	132	12	64	13	252
839	Seattle	1038	75	32	57	15	312
840	San Diego	1416	137	11	83	15	310

Table B.4 SERVICE PREFERENCE (JUNIOR)

NRD	NRD NAME	USN	USA	USAF	USMC	USCG
102	Boston	438	685	383	125	13
103	Buffalo	396	977	432	264	7
104	New York	65	172	157	20	0
119	Philadelphia	135	254	111	85	1
120	Pittsburgh	385	783	447	300	3
310	Montgomery	486	631	540	207	1
312	Jacksonville	590	734	239	119	0
313	Atlanta	673	837	389	164	0
314	Nashville	671	1591	566	340	0
315	Raleigh	345	771	405	234	6
316	Richmond	235	609	247	145	6
348	Miami	374	694	272	159	0
517	Cleveland	104	280	143	80	0
518	Columbus	416	446	381	70	1
521	Chicago	108	347	167	33	0
522	Detroit	256	649	381	171	0
528	Minneapolis	429	958	317	269	0
529	Omaha	459	1247	365	75	5
542	Indianapolis	134	463	218	113	1
559	Milwaukee	228	550	276	168	0
724	St. Louis	258	310	358	41	0
727	Kansas City	175	546	172	168	3
731	Dallas	181	373	268	95	3
732	Houston	200	305	105	107	0
733	Little Rock	478	916	405	247	0
734	New Orleans	284	731	268	153	2
746	San Antonio	161	269	118	111	11
747	Memphis	384	614	179	101	10
825	Denver	218	419	178	188	9
830	Albuquerque	280	442	251	70	1
836	Los Angeles	283	535	417	116	1
837	Portland	464	960	227	321	18
838	San Francisco	309	605	486	79	24
839	Seattle	323	703	358	130	15
840	San Diego	498	869	317	285	3

Table B.5 MEAN TEST SCORES (SENIOR)

NRD	NRD NAME	AFQT	EI	AS	MC
102	Boston	65.09	46.77	46.03	51.86
103	Buffalo	68.11	47.18	45.73	52.51
104	New York	67.74	46.62	44.25	51.3
119	Philadelphia	66.64	46.78	45.47	51.69
120	Pittsburgh	65.9	47.53	46.11	51.59
310	Montgomery	63.3	46.96	45.13	51.21
312	Jacksonville	65.77	47.21	45.34	51.55
313	Atlanta	66.78	47.41	44.83	51.01
314	Nashville	64.3	47.13	45.74	51.15
315	Raleigh	65.2	47.41	45.49	51.06
316	Richmond	65.75	47.63	45.37	51.1
348	Miami	65.31	47.35	44.82	51.8
517	Cleveland	63.56	47.66	46.6	52.06
518	Columbus	63.55	47.32	46.21	51.26
521	Chicago	62.67	46.76	44.85	51.53
522	Detroit	63.87	46.96	46.18	52.11
528	Minneapolis	69.46	47.76	46.66	52.99
529	Omaha	68.84	47.04	46.9	53.05
542	Indianapolis	65.36	46.47	46.39	52.07
559	Milwaukee	68.94	48.33	46.46	52.46
724	St. Louis	65.41	47.11	46.25	51.58
727	Kansas City	68.26	47.5	47.35	52.29
731	Dallas	67.91	47.27	46.18	51.92
732	Houston	64.05	46.67	45.73	51.44
733	Little Rock	64.84	47.18	46.34	51.72
734	New Orleans	64.94	47.29	44.88	51.11
746	San Antonio	66.58	47.19	44.31	52.23
747	Memphis	64.04	47.54	44.9	50.61
825	Denver	65.87	46.82	47.21	52.66
830	Albuquerque	65.03	46.8	45.31	51.84
836	Los Angeles	65.59	46.04	44.2	52.17
837	Portland	67.29	46.38	46.36	53.7
838	San Francisco	66.38	46.67	46.01	52.6
839	Seattle	68.46	46.85	47.4	53.7
840	San Diego	64.7	46.45	45.5	52.31

Table B.6 FUTURE INTENTIONS (SENIOR)

NRD	NRD NAME	4 YEAR COLLEGE	2 YEAR COLLEGE	VO TECH	MIL	WRK	UND
102	Boston	223	43	10	44	5	89
103	Buffalo	285	73	10	30	12	78
104	New York	193	14	5	10	6	40
119	Philadelphia	220	26	2	29	4	65
120	Pittsburgh	409	77	18	33	13	93
310	Montgomery	383	55	8	31	2	79
312	Jacksonville	517	102	25	61	14	145
313	Atlanta	741	66	58	49	17	128
314	Nashville	694	98	23	57	28	182
315	Raleigh	515	93	34	46	13	117
316	Richmond	584	62	12	45	18	134
348	Miami	397	76	15	45	8	127
517	Cleveland	158	22	3	23	7	67
518	Columbus	328	56	11	33	14	93
521	Chicago	187	40	2	20	4	56
522	Detroit	391	51	8	43	17	130
528	Minneapolis	236	16	22	15	3	56
529	Omaha	323	46	30	33	5	83
542	Indianapolis	158	24	10	12	11	42
559	Milwaukee	144	11	16	14	3	34
724	St. Louis	360	58	19	36	24	93
727	Kansas City	380	48	6	17	9	93
731	Dallas	657	100	11	18	10	133
732	Houston	410	63	8	34	12	81
733	Little Rock	704	102	34	36	22	150
734	New Orleans	523	37	32	41	26	99
746	San Antonio	849	67	5	40	15	119
747	Memphis	501	81	8	33	9	87
825	Denver	191	33	5	17	3	56
830	Albuquerque	493	59	13	34	8	91
836	Los Angeles	384	107	11	39	5	92
837	Portland	355	76	19	29	10	81
838	San Francisco	336	144	10	34	10	121
839	Seattle	455	94	36	36	14	158
840	San Diego	398	131	9	57	13	134

Table B.7 SERVICE PREFERENCE (SENIOR)

NRD	NRD NAME	USN	USA	USAF	USMC	USCG
102	Boston	71	155	108	69	11
103	Buffalo	120	191	104	65	9
104	New York	21	109	77	60	1
119	Philadelphia	70	181	43	49	3
120	Pittsburgh	182	271	145	45	0
310	Montgomery	140	220	131	69	0
312	Jacksonville	254	328	161	123	0
313	Atlanta	362	443	160	97	0
314	Nashville	222	479	249	132	0
315	Raleigh	220	350	185	65	0
316	Richmond	210	428	169	55	0
348	Miami	176	387	42	61	2
517	Cleveland	82	73	84	41	0
518	Columbus	122	174	153	87	0
521	Chicago	46	150	94	20	0
522	Detroit	147	290	150	53	0
528	Minneapolis	131	136	33	48	0
529	Omaha	76	288	137	15	4
542	Indianapolis	67	128	48	14	0
559	Milwaukee	69	87	34	32	0
724	St. Louis	140	274	115	61	0
727	Kansas City	128	248	57	109	17
731	Dallas	151	266	355	157	0
732	Houston	184	252	129	43	0
733	Little Rock	294	424	201	129	0
734	New Orleans	95	345	178	138	3
746	San Antonio	302	501	193	99	2
747	Memphis	178	349	102	92	0
825	Denver	74	113	62	52	4
830	Albuquerque	197	213	174	108	6
836	Los Angeles	140	303	114	80	1
837	Portland	86	279	116	88	1
838	San Francisco	128	312	149	61	5
839	Seattle	209	401	76	99	8
840	San Diego	146	336	157	98	6

APPENDIX C. INDIVIDUAL MODELS (JUNIOR)

This appendix presents the results of the logistic regression models as generated by SAS Release 6.07. Table C.1 through Table C.4 show the results of the one-factor regression models. Table C.5 through C.7 present the results of the interaction effects as discussed in previous chapters.

Table C.1 THE LOGISTIC PROCEDURE - FUTURE INTENTIONS

Response Variable: JQMI
Response Levels: 2
Number of Observations: 50198
Link Function: Logit

Response Profile

Ordered Value	JQMI	Count
1	0	49667
2	1	531

Criteria for Assessing Model Fit

Criterion	Intercept Only	Intercept and Covariates	Chi-Square for Covariates
AIC	5889.368	5847.015	.
SC	5898.191	5882.310	.
-2 LOG L	5887.368	5839.015	48.353 with 3 DF (p=0.0001)
Score	.	.	55.306 with 3 DF (p=0.0001)

Table C.1 THE LOGISTIC PROCEDURE (CONTINUED)

Analysis of Maximum Likelihood Estimates

Var	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square	Standard Estimate	Odds Ratio
INTERCPT	1	3.9048	0.1683	538.0620	0.0001	.	49.639
PLANED	1	0.8064	0.1766	20.8626	0.0001	0.1793	2.240
PLANWK	1	0.7420	0.5298	1.9612	0.1614	0.0373	2.100
PLANUD	1	0.1622	0.1894	0.7331	0.3919	0.0328	1.176

Association of Predicted Probabilities and Observed Responses

Concordant	= 27.0%	Somers' D	= 0.129
Discordant	= 14.1%	Gamma	= 0.314
Tied	= 58.9%	Tau-a	= 0.003
(26373177 pairs)		c	= 0.564

Table C.2 THE LOGISTIC PROCEDURE - TIME OF YEAR AFQT TAKEN

Response Variable: JQMI
Response Levels: 2
Number of Observations: 50198
Link Function: Logit

Response Profile

Ordered Value	JQMI	Count
1	0	49667
2	1	531

Criteria for Assessing Model Fit

Criterion	Intercept Only	Intercept and Covariates	Chi-Square for Covariates
AIC	5889.368	5891.814	.
SC	5898.191	5927.109	.
-2 LOG L	5887.368	5883.814	3.554 with 3 DF (p=0.3139)
Score	.	.	3.417 with 3 DF (p=0.3317)

Analysis of Maximum Likelihood Estimates

Var	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square	Standard Estimate	Odds Ratio
INTERCPT	1	4.5223	0.0564	6433.5896	0.0001	.	92.047
WINTER	1	-0.0347	0.0983	0.1244	0.7243	-0.008578	0.966
SPRING	1	0.2346	0.1467	2.5573	0.1098	0.043295	1.264
SUMMER	1	-0.3871	0.7150	0.2932	0.5882	-0.010722	0.679

Association of Predicted Probabilities and Observed Responses

Concordant	= 11.9%	Somers' D	= 0.026
Discordant	= 9.2%	Gamma	= 0.125
Tied	= 78.9%	Tau-a	= 0.001
(26373177 pairs)		c	= 0.513

Table C.3 THE LOGISTIC PROCEDURE - SERVICE PREFERENCE

Response Variable: JQM1
Response Levels: 2
Number of Observations: 50198
Link Function: Logit

Response Profile

Ordered Value	JQM1	Count
1	0	49667
2	1	531

Criteria for Assessing Model Fit

Criterion	Intercept Only	Intercept and Covariates	Chi-Square for Covariates
AIC	5889.368	5894.501	.
SC	5898.191	5938.619	.
-2 LOG L	5887.368	5884.501	2.867 with 4 DF (p=0.5804)
Score	.	.	2.858 with 4 DF (p=0.5819)

Analysis of Maximum Likelihood Estimates

Var	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square	Standard Estimate	Odds Ratio
INTERCPT	1	4.5419	0.0914	2469.7662	0.0001	.	93.868
ARMY	1	0.0623	0.1134	0.3013	0.5830	0.017077	1.064
AIRFORCE	1	-0.0821	0.1293	0.4031	0.5255	-0.018459	0.921
MARINES	1	-0.1227	0.1555	0.6227	0.4300	-0.020918	0.885
COASTIES	1	0.5015	1.0074	0.2479	0.6186	0.015390	1.651

Association of Predicted Probabilities and Observed Responses

Concordant	= 26.3%	Somers' D	= 0.030
Discordant	= 23.2%	Gamma	= 0.061
Tied	= 50.5%	Tau-a	= 0.001
(26373177 pairs)		c	= 0.515

Table C.4 THE LOGISTIC PROCEDURE - GEOGRAPHIC AREA

Response Variable: JQMI
Response Levels: 2
Number of Observations: 50198
Link Function: Logit

Response Profile

Ordered Value	JQMI	Count
1	0	49667
2	1	531

Criteria for Assessing Model Fit

Criterion	Intercept Only	Intercept and Covariates	Chi-Square for Covariates
AIC	5889.368	5846.121	.
SC	5898.191	5890.240	.
-2 LOG L	5887.368	5836.121	51.247 with 4 DF (p=0.0001)
Score	.	.	50.435 with 4 DF (p=0.0001)

Analysis of Maximum Likelihood Estimates

Var	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square	Standard Estimate	Odds Ratio
INTERCPT	1	4.2222	0.0804	2758.4094	0.0001	.	68.185
REGION1	1	0.8106	0.1728	22.0003	0.0001	0.151399	2.249
REGION3	1	0.0765	0.1103	0.4816	0.4877	0.018608	1.080
REGION5	1	0.6803	0.1404	23.4723	0.0001	0.151517	1.975
REGION7	1	0.5426	0.1399	15.0522	0.0001	0.115302	1.720

Association of Predicted Probabilities and Observed Responses

Concordant	= 45.6%	Somers' D	= 0.166
Discordant	= 29.0%	Gamma	= 0.222
Tied	= 25.4%	Tau-a	= 0.003
(26373177 pairs)		c	= 0.583

Table C.5 THE LOGISTIC PROCEDURE - FUTURE INTENTIONS AND TIME OF YEAR AFQT TAKEN

Response Variable: JQMI
Response Levels: 2
Number of Observations: 50198
Link Function: Logit

Response Profile

Ordered Value	JQM1	Count
1	0	49667
2	1	531

Criteria for Assessing Model Fit

Criterion	Intercept Only	Intercept and Covariates	Chi-Square for Covariates
AIC	5889.368	5882.703	.
SC	5898.191	5917.998	.
-2 LOG L	5887.368	5874.703	12.664 with 3 DF (p=0.0054)
Score	.	.	14.525 with 3 DF (p=0.0023)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square	Standard Estimate	Odds Ratio
INTERCPT	1	4.1002	0.1251	1074.9588	0.0001	.	60.354
MILMOTSN	1	0.4863	0.1349	12.9867	0.0003	0.112	1.626
MILMOTFY	1	-0.0101	0.5194	0.0004	0.9846	-0.0004	0.990
MILMOTFN	1	0.5094	0.1740	8.5716	0.0034	0.0973	1.664

Association of Predicted Probabilities and Observed Responses

Concordant	= 22.2%	Somers' D	= 0.049
Discordant	= 17.4%	Gamma	= 0.122
Tied	= 60.4%	Tau-a	= 0.001
(26373177 pairs)		c	= 0.524

Table C.6 THE LOGISTIC PROCEDURE - FUTURE INTENTIONS AND GEOGRAPHIC AREA

Response Variable: JQMI
Response Levels: 2
Number of Observations: 50198
Link Function: Logit

Response Profile

Ordered Value	JQMI	Count
1	0	49667
2	1	531

Criteria for Assessing Model Fit

Criterion	Intercept Only	Intercept and Covariates	Chi-Square for Covariates
AIC	5889.368	5843.158	.
SC	5898.191	5931.395	.
-2 LOG L	5887.368	5823.158	64.210 with 9 DF (p=0.0001)
Score	.	.	69.019 with 9 DF (p=0.0001)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square	Standard Estimate	Odds Ratio
INTERCPT	1	3.6399	0.2112	296.9234	0.0001	.	38.087
REGMIL1Y	1	0.8746	0.6177	2.0047	0.1568	0.035722	2.398
REGMIL3Y	1	0.1489	0.3833	0.1509	0.6977	0.007752	1.161
REGMIL5Y	1	1.0077	0.6174	2.6643	0.1026	0.043942	2.739
REGMIL7Y	1	0.3178	0.4631	0.4708	0.4926	0.013943	1.374
REGMIL1N	1	1.4222	0.2642	28.9889	0.0001	0.260778	4.146
REGMIL3N	1	0.6813	0.2251	9.1630	0.0025	0.163767	1.976
REGMIL5N	1	1.2697	0.2417	27.5940	0.0001	0.279271	3.560
REGMIL7N	1	1.1696	0.2425	23.2556	0.0001	0.244959	3.221
REGMIL8N	1	0.6605	0.2284	8.3589	0.0038	0.145508	1.936

Table C.6 THE LOGISTIC PROCEDURE (CONTINUED)

Association of Predicted Probabilities and Observed Responses

Concordant = 41.2%	Somers' D = 0.178
Discordant = 23.4%	Gamma = 0.276
Tied = 35.4%	Tau-a = 0.004
(26373177 pairs)	c = 0.589

Table C.7 THE LOGISTIC PROCEDURE - SERVICE PREFERENCE AND GEOGRAPHIC AREA

Response Variable: JQMI
Response Levels: 2
Number of Observations: 50198
Link Function: Logit

Response Profile

Ordered Value	JQMI	Count
1	0	49667
2	1	531

Criteria for Assessing Model Fit

Criterion	Intercept Only	Intercept and Covariates	Chi-Square for Covariates
AIC	5889.368	5852.748	.
SC	5898.191	5940.985	.
-2 LOG L	5887.368	5832.748	54.620 with 9 DF (p=0.0001)
Score	.	.	53.918 with 9 DF (p=0.0001)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square	Standard Estimate	Odds Ratio
INTERCPT	1	4.2724	0.1612	702.0843	0.0001	.	71.692
REGPRF1N	1	0.7817	0.3712	4.4342	0.0352	0.071433	2.185
REGPRF3N	1	-0.1347	0.2125	0.4014	0.5264	-0.018589	0.874
REGPRF5N	1	0.9028	0.3314	7.4236	0.0064	0.100424	2.467
REGPRF7N	1	0.6071	0.2983	4.1424	0.0418	0.067333	1.835
REGPRF1O	1	0.7548	0.2358	10.2458	0.0014	0.127013	2.127
REGPRF3O	1	0.0875	0.1847	0.2245	0.6356	0.019200	1.091
REGPRF5O	1	0.5696	0.2043	7.7713	0.0053	0.115946	1.768
REGPRF7O	1	0.4601	0.2062	4.9761	0.0257	0.087810	1.584
REGPRF8O	1	-0.0673	0.1860	0.1310	0.7174	-0.013602	0.935

Table C.7 THE LOGISTIC PROCEDURE (CONTINUED)

Association of Predicted Probabilities and Observed Responses

Concordant	= 46.4%	Somers' D	= 0.174
Discordant	= 29.0%	Gamma	= 0.231
Tied	= 24.6%	Tau-a	= 0.004
(26373177 pairs)		c	= 0.587

APPENDIX D. INDIVIDUAL MODELS (SENIOR)

This appendix presents the results of the logistic regression model as generated by SAS Release 6.07. Table D.1 through D.4 show the results of the one-factor regression models. Table D.5 through D.7 present the results of the interaction effect models.

Table D.1 THE LOGISTIC PROCEDURE - FUTURE INTENTIONS

Response Variable: SQM1
Response Levels: 2
Number of Observations: 22020
Link Function: Logit

Response Profile

Ordered Value	SQM1	Count
1	0	21925
2	1	95

Criteria for Assessing Model Fit

Criterion	Intercept Only	Intercept and Covariates	Chi-Square for Covariates
AIC	1226.297	1201.908	.
SC	1234.297	1233.907	.
-2 LOG L	1224.297	1193.908	30.389 with 3 DF (p=0.0001)
Score	.	.	39.181 with 3 DF (p=0.0001)

Table D.1 THE LOGISTIC PROCEDURE (CONTINUED)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square	Standard Estimate	Odds Ratio
INTERCPT	1	4.3116	0.2517	293.5072	0.0001	.	74.562
PLANED	1	1.5128	0.2888	27.4406	0.0001	0.350568	4.539
PLANWK	1	0.5636	0.6318	0.7956	0.3724	0.041291	1.757
PLANUD	1	0.5665	0.3195	3.1434	0.0762	0.113423	1.762

Association of Predicted Probabilities and Observed Responses

Concordant	= 39.5%	Somers' D	= 0.258
Discordant	= 13.7%	Gamma	= 0.486
Tied	= 46.8%	Tau-a	= 0.002
(2082875 pairs)		c	= 0.629

Table D.2 THE LOGISTIC PROCEDURE - TIME OF YEAR AFQT TAKEN

Response Variable: SQMI
Response Levels: 2
Number of Observations: 22020
Link Function: Logit

Response Profile

Ordered Value	SQMI	Count
1	0	21925
2	1	95

Criteria for Assessing Model Fit

Criterion	Intercept Only	Intercept and Covariates	Chi-Square for Covariates
AIC	1226.297	1228.803	.
SC	1234.297	1252.802	.
-2 LOG L	1224.297	1222.803	1.494 with 2 DF (p=0.4738)
Score	.	.	1.634 with 2 DF (p=0.4417)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square	Standard Estimate	Odds Ratio
INTERCPT	1	5.5079	0.1262	1903.5171	0.0001	.	246.635
WINTER	1	-0.1221	0.2525	0.2338	0.6287	-0.027379	0.885
SPRING	1	-0.4086	0.3277	1.5545	0.2125	-0.061938	0.665

Association of Predicted Probabilities and Observed Responses

Concordant = 10.6%	Somers' D = 0.034
Discordant = 7.3%	Gamma = 0.187
Tied = 82.1%	Tau-a = 0.000
(2082875 pairs)	c = 0.517

Table D.3 THE LOGISTIC PROCEDURE - SERVICE PREFERENCE

Response Variable: SQMI
Response Levels: 2
Number of Observations: 22020
Link Function: Logit

Response Profile

Ordered Value	SQMI	Count
1	0	21925
2	1	95

Criteria for Assessing Model Fit

Criterion	Intercept Only	Intercept and Covariates	Chi-Square for Covariates
AIC	1226.297	1228.971	.
SC	1234.297	1260.970	.
-2 LOG L	1224.297	1220.971	3.326 with 3 DF (p=0.3440)
Score	.	.	3.233 with 3 DF (p=0.3571)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square	Standard Estimate	Odds Ratio
INTERCPT	1	5.5323	0.2186	640.1906	0.0001	.	252.714
ARMY	1	-0.2648	0.2614	1.0265	0.3110	-0.072360	0.767
AIRFORCE	1	0.2434	0.3456	0.4959	0.4813	0.054233	1.276
MARINES	1	-0.0657	0.3730	0.0311	0.8601	-0.011722	0.936

Association of Predicted Probabilities and Observed Responses

Concordant	= 28.3%	Somers' D	= 0.079
Discordant	= 20.3%	Gamma	= 0.163
Tied	= 51.4%	Tau-a	= 0.001
(2082875 pairs)		c	= 0.540

Table D.4 THE LOGISTIC PROCEDURE - GEOGRAPHIC AREA

Response Variable: SQMI
Response Levels: 2
Number of Observations: 22020
Link Function: Logit

Response Profile

Ordered Value	SQMI	Count
1	0	21925
2	1	95

Criteria for Assessing Model Fit

Criterion	Intercept Only	Intercept and Covariates	Chi-Square for Covariates
AIC	1226.297	1217.958	.
SC	1234.297	1257.957	.
-2 LOG L	1224.297	1207.958	16.339 with 4 DF (p=0.0026)
Score	.	.	16.021 with 4 DF (p=0.0030)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square	Standard Estimate	Odds Ratio
INTERCPT	1	5.0075	0.1832	747.2602	0.0001	.	149.533
REGION1	1	0.0248	0.3247	0.0058	0.9392	0.004064	1.025
REGION3	1	0.3416	0.2635	1.6807	0.1948	0.083508	1.407
REGION5	1	0.9538	0.3986	5.7261	0.0167	0.183217	2.596
REGION7	1	1.0321	0.3168	10.6118	0.0011	0.257305	2.807

Association of Predicted Probabilities and Observed Responses

Concordant	= 44.9%	Somers' D	= 0.222
Discordant	= 22.7%	Gamma	= 0.328
Tied	= 32.3%	Tau-a	= 0.002
(2082875 pairs)		c	= 0.611

Table D.5 THE LOGISTIC PROCEDURE - FUTURE INTENTIONS AND TIME OF YEAR AFQT TAKEN

Response Variable: SQMI
Response Levels: 2
Number of Observations: 22020
Link Function: Logit

Response Profile

Ordered Value	SQMI	Count
1	0	21925
2	1	95

Criteria for Assessing Model Fit

Criterion	Intercept Only	Intercept and Covariates	Chi-Square for Covariates
AIC	1226.297	1216.084	.
SC	1234.297	1248.083	.
-2 LOG L	1224.297	1208.084	16.213 with 3 DF (p=0.0010)
Score	.	.	25.248 with 3 DF (p=0.0001)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square	Standard Estimate	Odds Ratio
INTERCPT	1	4.3830	0.2791	246.6573	0.0001	.	80.077
MILMOTSN	1	1.1837	0.3055	15.0136	0.0001	0.272497	3.266
MILMOTFY	1	-0.4577	0.6464	0.5015	0.4789	-0.021098	0.633
MILMOTFN	1	1.2021	0.3868	9.6610	0.0019	0.248977	3.327

Association of Predicted Probabilities and Observed Responses

Concordant	= 16.1%	Somers' D	= 0.115
Discordant	= 4.6%	Gamma	= 0.554
Tied	= 79.3%	Tau-a	= 0.001
(2082875 pairs)		c	= 0.557

Table D.6 THE LOGISTIC PROCEDURE - FUTURE INTENTIONS AND GEOGRAPHIC AREA

Response Variable: SQMI
Response Levels: 2
Number of Observations: 22020
Link Function: Logit

Response Profile

Ordered Value	SQMI	Count
1	0	21925
2	1	95

Criteria for Assessing Model Fit

Criterion	Intercept Only	Intercept and Covariates	Chi-Square for Covariates
AIC	1226.297	1209.714	.
SC	1234.297	1289.711	.
-2 LOG L	1224.297	1189.714	34.583 with 9 DF (p=0.0001)
Score	.	.	40.980 with 9 DF (p=0.0001)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr> Chi-Square	Standard Estimate	Odds Ratio
INTERCPT	1	4.5721	0.5026	82.7621	0.0001	.	96.750
REGMIL1Y	1	-0.2955	0.8715	0.1149	0.7346	-0.013221	0.744
REGMIL3Y	1	-0.1593	0.7111	0.0502	0.8227	-0.010737	0.853
REGMIL5Y	1	-0.7167	0.7127	1.0113	0.3146	-0.036830	0.488
REGMIL7Y	1	0.2681	0.8698	0.0950	0.7579	0.015815	1.307
REGMIL1N	1	0.5444	0.5800	0.8809	0.3480	0.086498	1.724
REGMIL3N	1	0.8706	0.5426	2.5746	0.1086	0.208668	2.388
REGMIL5N	1	2.0189	0.7092	8.1041	0.0044	0.377391	7.530
REGMIL7N	1	1.5678	0.5742	7.4554	0.0063	0.385745	4.796
REGMIL8N	1	0.4956	0.5397	0.8431	0.3585	0.106903	1.641

Table D.6 THE LOGISTIC PROCEDURE (CONTINUED)

Association of Predicted Probabilities and Observed Responses

Concordant = 53.7%	Somers' D = 0.310
Discordant = 22.7%	Gamma = 0.406
Tied = 23.6%	Tau-a = 0.003
(2082875 pairs)	c = 0.655

Table D.7 THE LOGISTIC PROCEDURE - SERVICE PREFERENCE AND GEOGRAPHIC AREA

Response Variable: SQMI
Response Levels: 2
Number of Observations: 22020
Link Function: Logit

Response Profile

Ordered Value	SQMI	Count
1	0	21925
2	1	95

Criteria for Assessing Model Fit

Criterion	Intercept Only	Intercept and Covariates	Chi-Square for Covariates
AIC	1226.297	1221.103	.
SC	1234.297	1301.100	.
-2 LOG L	1224.297	1201.103	23.194 with 9 DF (p=0.0058)
Score	.	.	24.596 with 9 DF (p=0.0035)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square	Standard Estimate	Odds Ratio
INTERCPT	1	5.8962	0.5781	104.0109	0.0001	.	363.667
REGPRF1N	1	-1.3766	0.7324	3.5329	0.0602	-0.109009	0.252
REGPRF3N	1	-0.7315	0.6678	1.1996	0.2734	-0.104199	0.481
REGPRF5N	1	0.0146	0.9141	0.0003	0.9873	0.001447	1.015
REGPRF7N	1	0.7036	0.9137	0.5930	0.4413	0.096892	2.021
REGPRF1O	1	-0.6628	0.6678	0.9850	0.3210	-0.097426	0.515
REGPRF3O	1	-0.4704	0.6222	0.5715	0.4497	-0.103126	0.625
REGPRF5O	1	0.0814	0.7081	0.0132	0.9085	0.013913	1.085
REGPRF7O	1	0.0206	0.6414	0.0010	0.9744	0.004700	1.021
REGPRF8O	1	-1.0620	0.6096	3.0353	0.0815	-0.212133	0.346

Table D.7 THE LOGISTIC PROCEDURE (CONTINUED)

Association of Predicted Probabilities and Observed Responses

Concordant = 48.9%	Somers' D = 0.263
Discordant = 22.6%	Gamma = 0.368
Tied = 28.5%	Tau-a = 0.002
(2082875 pairs)	c = 0.632

APPENDIX E. NRD MODELS (JUNIOR)

This appendix presents the results of the logistic regression model as generated by SAS Release 6.07. Table E.1 presents the results of the model addressing the proportion of high school junior students interested in the military out of those qualified and available. Figure 10 is a graphical representation of the predicted proportion of the population of high school junior students (produced by the model) versus the actual proportion. Table E.1.A presents the numerical output of the regression model for the actual versus predicted proportion of high school juniors interested in the military.

Table E.1 THE LOGISTIC PROCEDURE - JQMI OUT OF JQMA

Response Variable (Events): JQMI
Response Variable (Trials): JQMA
Number of Observations: 35
Link Function: Logit

Response Profile

Ordered Value	Binary Outcome	Count
1	EVENT	521
2	NO EVENT	49217

Criteria for Assessing Model Fit

Criterion	Intercept Only	Intercept and Covariates	Chi-Square for Covariates
AIC	5788.766	5738.646	.
SC	5797.581	5800.348	.
-2 LOG L	5786.766	5724.646	62.120 with 6 DF (p=0.0001)
Score	.	.	63.836 with 6 DF (p=0.0001)

Table E.1 THE LOGISTIC PROCEDURE (CONTINUED)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square	Standard Estimate	Odds Ratio
INTERCPT	1	-5.4541	0.4348	157.3594	0.0001	.	0.004
ARMF	1	1.482E-8	7E-9	4.4820	0.0343	0.051657	1.000
MDFAMINC	1	0.000031	0.000013	5.8034	0.0160	0.077461	1.000
REGION1	1	-0.7262	0.1939	14.0276	0.0002	-0.136164	0.484
REGION3	1	0.2245	0.1403	2.5613	0.1095	0.054768	1.252
REGION5	1	-0.4576	0.1634	7.8462	0.0051	-0.102265	0.633
REGION7	1	-0.1730	0.1744	0.9841	0.3212	-0.036890	0.841

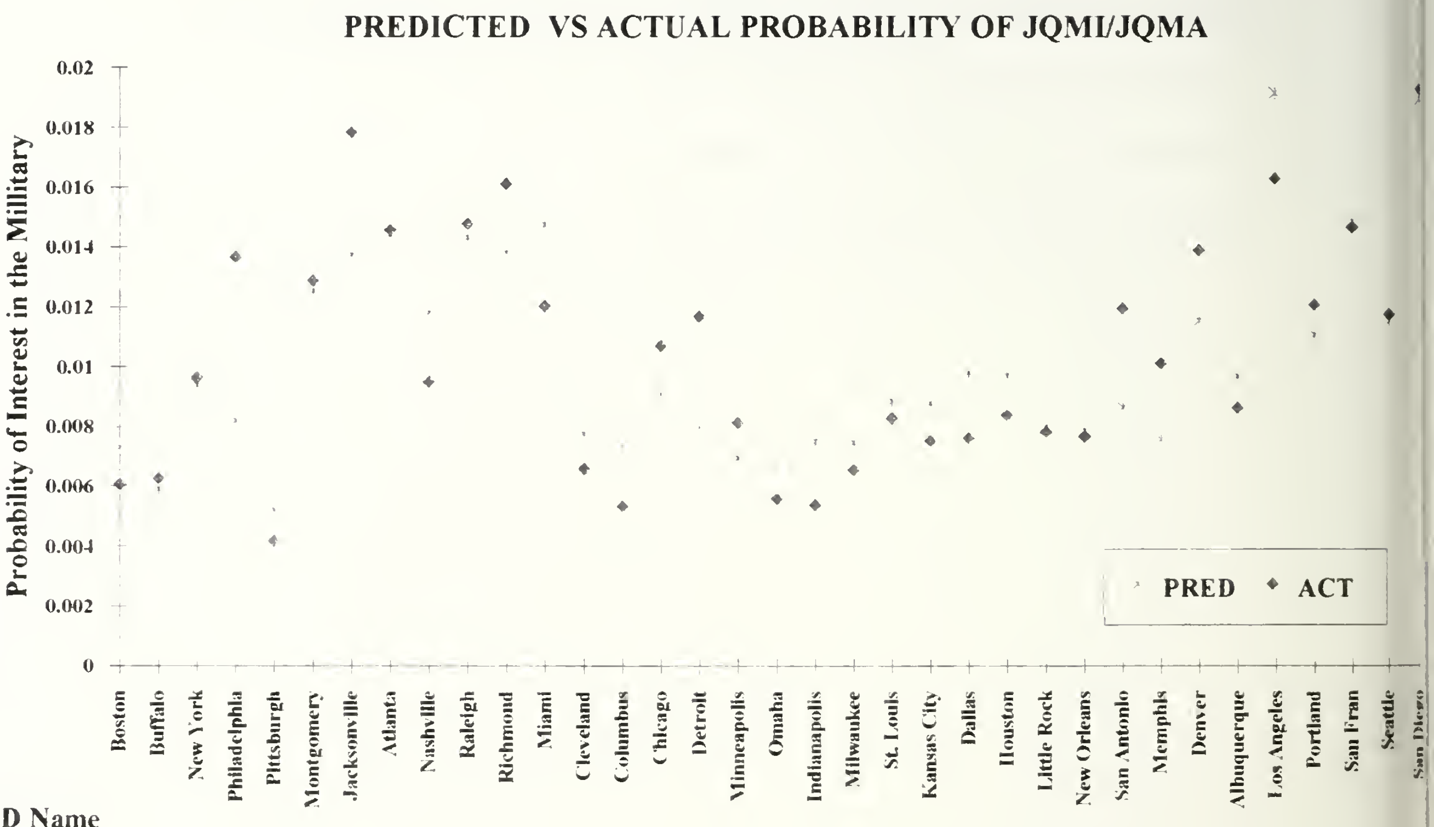

Figure 10: Predicted versus Actual Probability of JQMI/JQMA

Table E.1.A ACTUAL VERSUS PREDICTED JQMI

NRD	NRD NAME	ACTUAL	PREDICTED
102	Boston	10	14
103	Buffalo	13	9
104	New York	4	4
119	Philadelphia	8	5
120	Pittsburgh	8	12
310	Montgomery	24	20
312	Jacksonville	30	28
313	Atlanta	30	18
314	Nashville	30	32
315	Raleigh	26	25
316	Richmond	20	26
348	Miami	18	29
517	Cleveland	4	7
518	Columbus	7	11
521	Chicago	7	5
522	Detroit	17	6
528	Minneapolis	16	16
529	Omaha	12	15
542	Indianapolis	5	7
559	Milwaukee	8	9
724	St. Louis	8	7
727	Kansas City	8	7
731	Dallas	7	15
732	Houston	6	11
733	Little Rock	16	10
734	New Orleans	11	6
746	San Antonio	8	16
747	Memphis	13	8
825	Denver	14	8
830	Albuquerque	9	19
836	Los Angeles	22	24
837	Portland	24	12
838	San Francisco	22	22
839	Seattle	18	21
840	San Diego	38	39

MEAN SQUARE ERROR = 30 MEAN ERROR = 5.5

Table E.2 presents the logistic regression results for the proportion of the population of high school juniors available for military service of the target market population. Figure 11 is a graphical representation of the predicted proportion of the population of high school students available for military service out of the target market population (based on the developed model) versus the actual proportion of students. Table E.2.A presents the numerical results of the predicted versus actual proportion of students available for military service.

Table E.2 THE LOGISTIC PROCEDURE - JQMA OUT OF TARGET MARKET POPULATION (TOTAL)

Response Variable (Events): JQMA
Response Variable (Trials): TOTAL
Number of Observations: 35
Link Function: Logit

Response Profile

Ordered Value	Binary Outcome	Count
1	EVENT	49738
2	NO EVENT	8.2844E8

Criteria for Assessing Model Fit

Criterion	Intercept Only	Intercept and Covariates	Chi-Square for Covariates
AIC	1066439.9	988879.69	.
SC	1066458.5	989046.50	.
-2 LOG L	1066437.9	988861.69	77576.242 with 8 DF (p=0.0001)
Score	.	.	86854.429 with 8 DF (p=0.0001)

Table E.2 THE LOGISTIC PROCEDURE (CONTINUED)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square	Standard Estimate	Odds Ratio
INTERCPT	1	-3.6885	0.0622	3514.1921	0.0001	.	0.025
UNEMP	1	-17.0165	1.3188	166.4942	0.0001	-0.037623	0.000
NONADMIN	1	1.276E-8	2.76E-10	2136.8690	0.0001	2.461243	1.000
MDFAMINC	1	-0.00014	1.495E-6	9036.0210	0.0001	-0.437223	1.000
REGION1	1	0.0756	0.0175	18.7077	0.0001	0.015978	1.079
REGION3	1	0.3679	0.0148	617.7769	0.0001	0.055111	1.445
REGION5	1	0.5936	0.0153	1500.1628	0.0001	0.110446	1.810
REGION7	1	-0.1784	0.0160	124.0461	0.0001	-0.030583	0.837
BLPOV	1	-2.63E-7	4.726E-9	3090.6458	0.0001	-2.873555	1.000

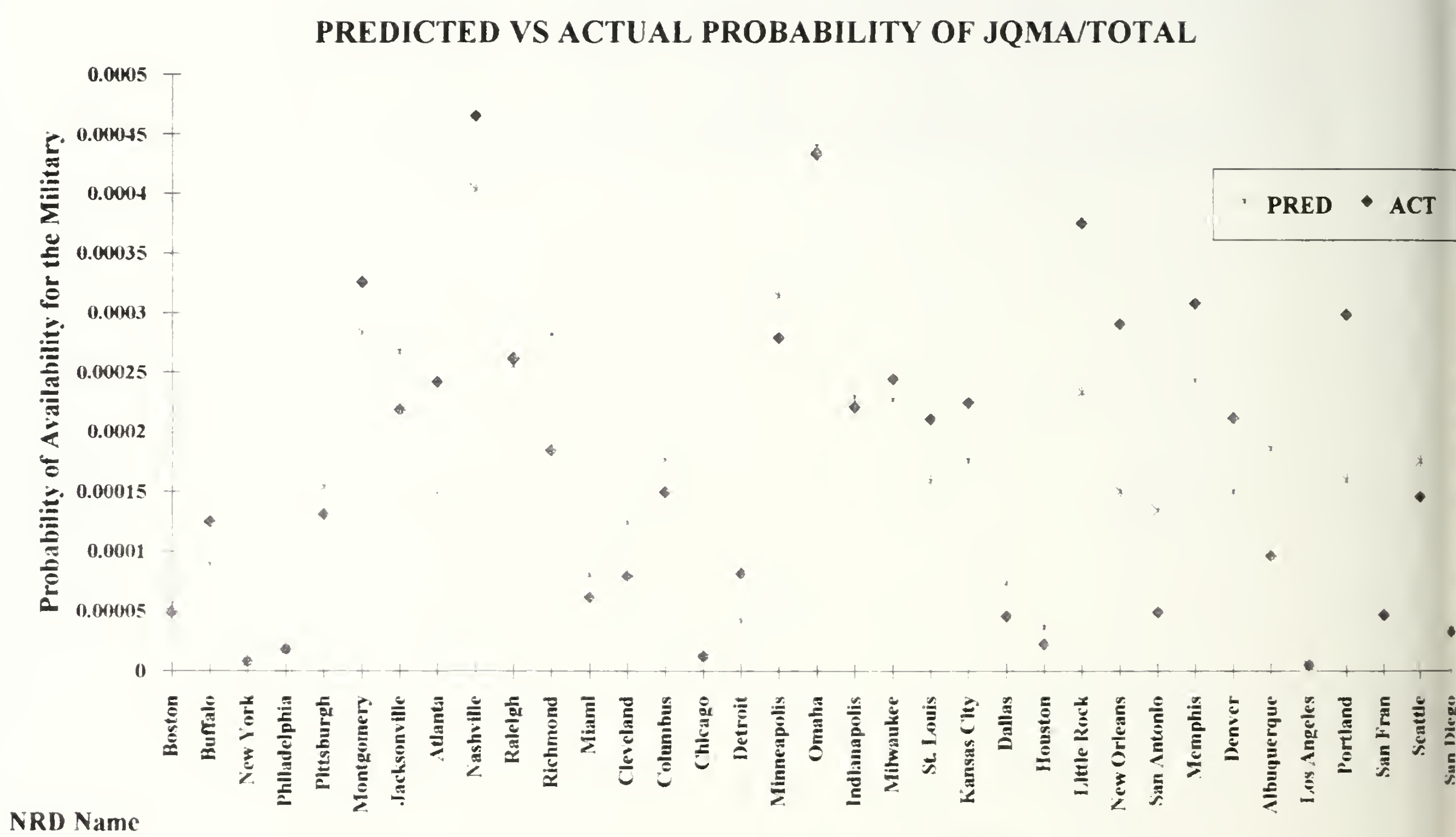

Figure 11: Predicted versus Actual Probability of JQMA/TOTAL

Table E.2.A ACTUAL VERSUS PREDICTED JQMA

NRD	NRD NAME	ACTUAL	PREDICTED
102	Boston	1644	1897
103	Buffalo	2076	1486
104	New York	414	400
119	Philadelphia	586	598
120	Pittsburgh	1918	2257
310	Montgomery	1865	1624
312	Jacksonville	1682	2060
313	Atlanta	2063	1277
314	Nashville	3168	2746
315	Raleigh	1761	1716
316	Richmond	1242	1900
348	Miami	1499	1957
517	Cleveland	607	949
518	Columbus	1314	1549
521	Chicago	655	552
522	Detroit	1457	750
528	Minneapolis	1973	2224
529	Omaha	2151	2185
542	Indianapolis	929	965
559	Milwaukee	1222	1135
724	St. Louis	967	733
727	Kansas City	1064	836
731	Dallas	920	1490
732	Houston	717	1180
733	Little Rock	2046	1276
734	New Orleans	1438	745
746	San Antonio	670	1831
747	Memphis	1288	1018
825	Denver	1012	718
830	Albuquerque	1044	2010
836	Los Angeles	1352	1238
837	Portland	1990	1065
838	San Francisco	1503	1484
839	Seattle	1529	1843
840	San Diego	1972	2045

MEAN SQUARE ERROR = 230,203 MEAN ERROR = 479.8

APPENDIX F. NRD MODELS (SENIOR)

This appendix presents the results of the logistic regression model generated by SAS Release 6.07. Table F.1 shows the results of the regression model addressing the population of the high school senior students interested in the military out of those qualified and available. Figure 12 is a graphical presentation of the predicted proportion of high school seniors interested in the military out of those available (produced using the developed model) versus the actual proportion of students. Table F.1.A is the numerical results of the predicted versus actual proportion of students interested in the military.

Table F.1 THE LOGISTIC PROCEDURE - SQMI OUT OF SQMA

Response Variable (Events): SQMI
Response Variable (Trials): SQMA
Number of Observations: 35
Link Function: Logit

Response Profile

Ordered Value	Binary Outcome	Count
1	EVENT	95
2	NO EVENT	21811

Criteria for Assessing Model Fit

Criterion	Intercept Only	Intercept and Covariates	Chi-Square for Covariates
AIC	1225.309	1202.755	.
SC	1233.303	1242.728	.
-2 LOG L	1223.309	1192.755	30.554 with 4 DF (p=0.0001)
Score	.	.	42.363 with 4 DF (p=0.0001)

Table F.1 THE LOGISTIC PROCEDURE (CONTINUED)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square	Standard Estimate	Odds Ratio
INTERCPT	1	-7.7746	0.9096	73.0613	0.0001	.	0.000
ONEPRNT	1	-6.98E-8	3.257E-8	4.5861	0.0322	-2.081707	1.000
NONADMIN	1	2.701E-8	1.27E-8	4.5224	0.0335	2.062325	1.000
ARMF	1	3.192E-8	1.344E-8	5.6397	0.0176	0.104625	1.000
MDFAMINC	1	0.000069	0.00003	5.4865	0.0192	0.180905	1.000

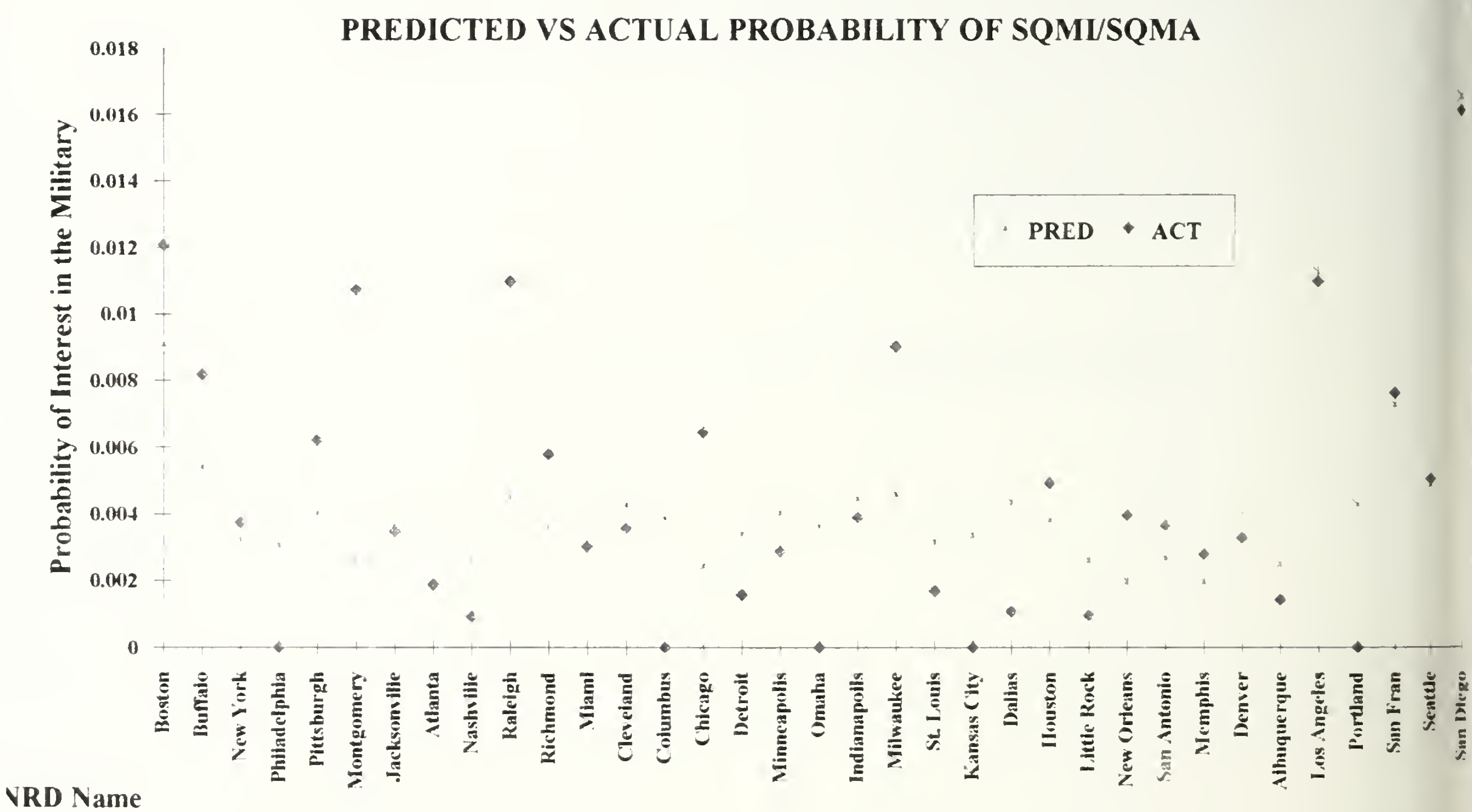

Figure 12: Predicted versus Actual Probability SQMI/SQMA

Table F.1.A ACTUAL VERSUS PREDICTED SQMI

NRD	NRD NAME	ACTUAL	PREDICTED
102	Boston	5	5
103	Buffalo	4	2
104	New York	1	1
119	Philadelphia	0	1
120	Pittsburgh	4	2
310	Montgomery	6	2
312	Jacksonville	3	3
313	Atlanta	2	2
314	Nashville	1	3
315	Raleigh	9	3
316	Richmond	5	3
348	Miami	2	3
517	Cleveland	1	1
518	Columbus	0	2
521	Chicago	2	1
522	Detroit	1	1
528	Minneapolis	1	2
529	Omaha	0	2
542	Indianapolis	1	1
559	Milwaukee	2	2
724	St. Louis	1	2
727	Kansas City	0	2
731	Dallas	1	4
732	Houston	3	3
733	Little Rock	1	2
734	New Orleans	3	1
746	San Antonio	4	4
747	Memphis	2	1
825	Denver	1	1
830	Albuquerque	1	2
836	Los Angeles	7	7
837	Portland	0	2
838	San Francisco	5	5
839	Seattle	4	3
840	San Diego	12	13

MEAN SQUARE ERROR = 3 MEAN ERROR = 1.7

Table F.2 presents the results of the regression model addressing the proportion of the population of high school seniors who are qualified and available for military service out of the target market population. Figure 13 is a graphical presentation of the predicted proportion of students available for military service out of the target market population versus the actual proportion of students. Table F.2.A present the numerical results of the predicted versus actual proportion of student available for the military (produced using the developed model).

Table F.2 THE LOGISTIC PROCEDURE - SQMA OUT OF TARGET MARKET POPULATION (TOTAL)

Response Variable (Events): SQMA
Response Variable (Trials): TOTAL
Number of Observations: 35
Link Function: Logit

Response Profile

Ordered Value	Binary Outcome	Count
1	EVENT	21906
2	NO EVENT	8.2846E8

Criteria for Assessing Model Fit

Criterion	Intercept Only	Intercept and Covariates	Chi-Square for Covariates
AIC	505617.91	472622.95	.
SC	505636.45	472789.77	.
-2 LOG L	505615.91	472604.95	33010.960 with 8 DF (p=0.0001)
Score	.	.	38603.979 with 8 DF (p=0.0001)

Table F.2 THE LOGISTIC REGRESSION (CONTINUED)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square	Standard Estimate	Odds Ratio
INTERCPT	1	-5.2287	0.0942	3079.1271	0.0001	.	0.005
UNEMP	1	-7.9990	1.8279	19.1493	0.0001	-0.017685	0.000
ONEPRNT	1	3.34E-8	1.13E-9	874.0154	0.0001	2.483765	1.000
MDFAMINC	1	-0.00013	2.273E-6	3143.5157	0.0001	-0.392212	1.000
REGION1	1	-0.3430	0.0304	127.4939	0.0001	-0.072486	0.710
REGION3	1	0.4210	0.0221	363.9234	0.0001	0.063070	1.523
REGION5	1	0.1979	0.0250	62.8401	0.0001	0.036826	1.219
REGION7	1	0.2688	0.0222	146.8033	0.0001	0.046087	1.308
BLPOV	1	-2.69E-7	7.458E-9	1300.6010	0.0001	-2.941930	1.000

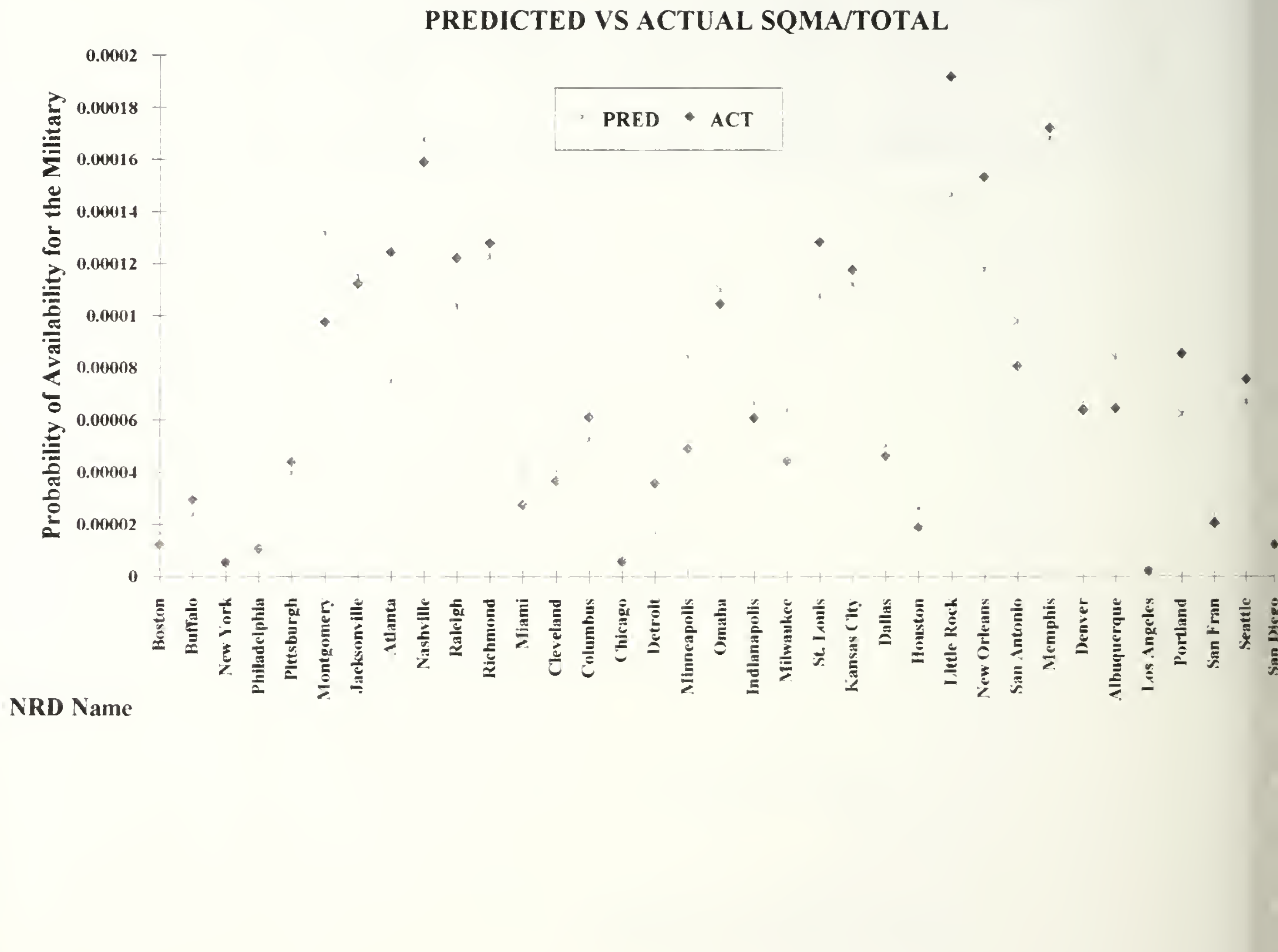

Figure 13: Predicted versus Actual SQMA/TOTAL

Table F.2.A ACTUAL VERSUS PREDICTED SQMA

NRD	NRD NAME	ACTUAL	PREDICTED
102	Boston	414	563
103	Buffalo	489	397
104	New York	268	288
119	Philadelphia	346	333
120	Pittsburgh	643	580
310	Montgomery	560	755
312	Jacksonville	866	889
313	Atlanta	1062	638
314	Nashville	1082	1142
315	Raleigh	820	699
316	Richmond	862	826
348	Miami	668	971
517	Cleveland	280	313
518	Columbus	536	462
521	Chicago	310	293
522	Detroit	640	301
528	Minneapolis	348	598
529	Omaha	520	547
542	Indianapolis	257	280
559	Milwaukee	222	319
724	St. Louis	590	495
727	Kansas City	559	532
731	Dallas	929	1009
732	Houston	608	851
733	Little Rock	1048	800
734	New Orleans	759	583
746	San Antonio	1097	1335
747	Memphis	721	705
825	Denver	305	316
830	Albuquerque	698	906
836	Los Angeles	638	592
837	Portland	570	417
838	San Francisco	655	709
839	Seattle	793	703
840	San Diego	743	761

MEAN SQUARE ERROR = 24,813   MEAN ERROR = 157.5

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